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MOTOR AGE

From Coast to Coast in a Motor Car

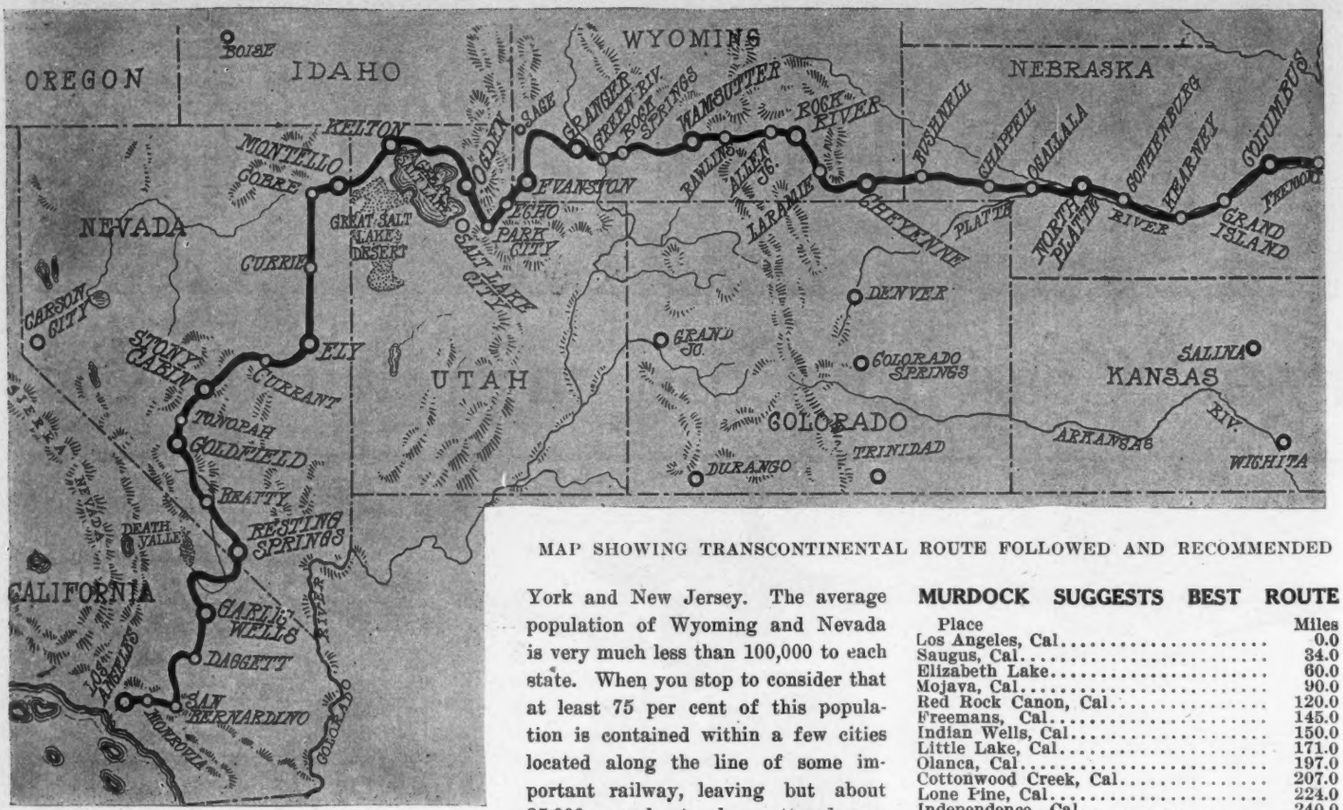
THE first owner to drive his own car from the Pacific to the Atlantic, carrying with him his family, was J. M. Murdock, of Johnstown, Pa., who left Los Angeles, Cal., in a Packard on April 24, 1908, and arrived in New York city May 26, 1908. The total distance was 3693.8 miles, which was covered in 32 days 5 hours and 25 minutes elapsed time and which still is a transcontinental record for a continuous run of the same car and driver. The actual running time was 25 days 5 hours 25 minutes, for Mr. Murdock observed the Sabbath and rested 5 Sundays and 2 week days. After a lapse of 3 years Mr. Murduck is just as keen a motoring enthusiast as ever, and in the accompanying article he gives his views of the proper equipment for a transcontinental touring party, the route to follow and other valuable information which is gained only by experience

By J. M. Murdock

WHILE the time has come when a motor trip can be safely made from one ocean to the other, it has not come when such a trip can be made with all the luxuries and conveniences of a tour through the White mountains, as outlined and set forth by the Automobile Club of America in the ideal tour, yet there are so many striking features, so much awe-inspiring scenery, so many varied experiences, that none with whom I ever have talked who have made the trip—and in the past 3 years there have been many of these—will not say their efforts have been well expended.

Unless one has lived or spent much time in the west, it is difficult to realize the conditions that actually exist, and which must be faced by any one making a trip across the continent by motor cars.

In speaking of the roads through the western country, people are likely to forget that, unless a state is wealthy and has a high assessed valuation liable for taxes to both build and maintain, it can neither build nor maintain roads. A little



MAP SHOWING TRANSCONTINENTAL ROUTE FOLLOWED AND RECOMMENDED

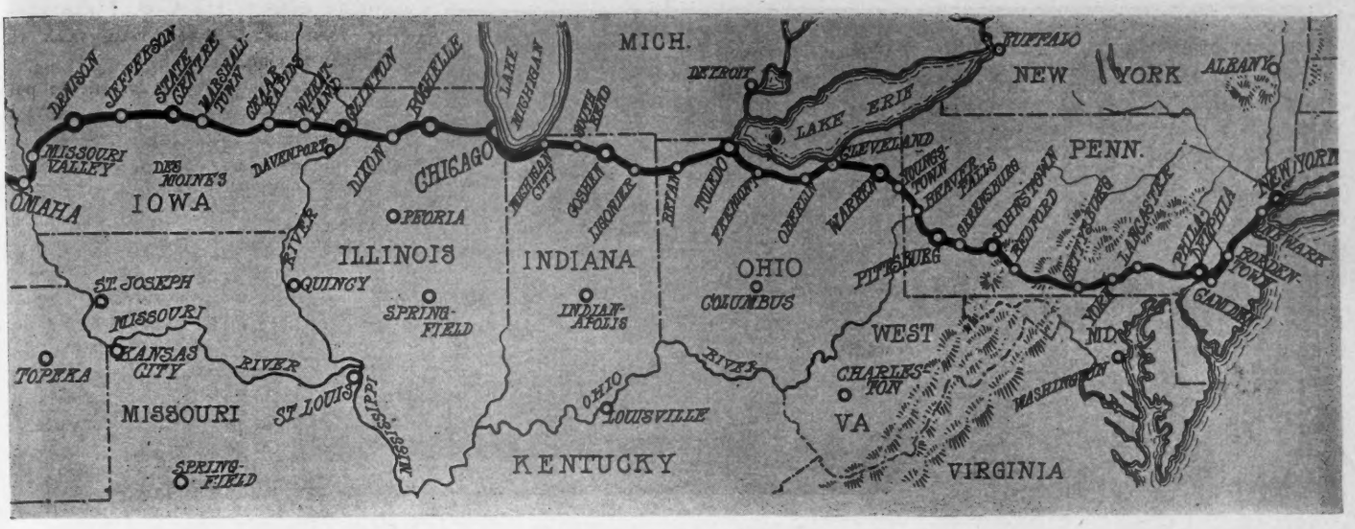
bit of statistical information may help you to appreciate this more fully. Take the states of Nevada and Wyoming, both of which must be crossed in making a trip by motor car from ocean to ocean; the former, diagonally, from one corner to the other—the latter, its full length. These two states have an assessed valuation liable to taxation for road purposes of less than $1,000 per mile, as against $100,000 per mile in New York state. Yet either of these states has more than two-thirds the number of miles of roads that New York state has.

The area of either Wyoming or Nevada is, in round numbers, equal to the area of the combined states of Pennsylvania, New York and New Jersey. The average population of Wyoming and Nevada is very much less than 100,000 to each state. When you stop to consider that at least 75 per cent of this population is contained within a few cities located along the line of some important railway, leaving but about 25,000 people to be scattered over the remainder of the state, it is not hard to realize that it would be quite easy to travel in a machine all day long without meeting any one. It helps you to appreciate the feeling that comes over you as you travel hour after hour through this desert country without seeing the least sign of an inhabitant or any other evidence of civilization. I recall one memorable part of our journey. We left camp early one morning, met a burro team 2 hours later, and did not meet another individual on the road until about 4 o'clock the next afternoon. We were so impressed that we stopped and told the driver that he was the first person we had met in 2 days' travel.

MOTORING CAMP ON EDGE OF MOJAVE DESERT

MURDOCK SUGGESTS BEST ROUTE

Place	Miles
Los Angeles, Cal.	0.0
Saugus, Cal.	34.0
Elizabeth Lake	60.0
Mojava, Cal.	90.0
Red Rock Canon, Cal.	120.0
Freemans, Cal.	145.0
Indian Wells, Cal.	150.0
Little Lake, Cal.	171.0
Olanca, Cal.	197.0
Cottonwood Creek, Cal.	207.0
Lone Pine, Cal.	224.0
Independence, Cal.	240.0
Gilbert Ranch, Nev.	304.0
Goldfield, Nev.	378.0
Tonopah, Nev.	406.0
Hanapah, Nev.	428.0
Hot Springs, Nev.	479.9
Twin Springs, Nev.	490.9
Blue Eagle, Nev.	545.5
Currant, Nev.	559.9
Ely, Nev.	618.3
Cherry Creek, Nev.	670.3
Curry, Nev.	700.3
Cobre, Nev.	768.3
Montello, Nev.	786.3
Lucin, Utah.	814.3
Terrace, Utah.	838.3
Kelton, Utah.	870.1
Lake Side, Utah.	894.1
Corrine, Utah.	936.6
Ogden, Utah.	966.6
Morgan, Utah.	988.6
Devil's Slide, Utah.	998.6
Echo, Wyo.	1,006.6
Castle Rock, Wyo.	1,022.6
Wahsatch Hill, Wyo.	1,031.6
Evanston, Wyo.	1,051.6
Cumberland, Wyo.	1,100.6
Opal, Wyo.	1,126.6
Granger, Wyo.	1,154.5
Marston Wash, Wyo.	1,166.5
Green River, Wyo.	1,190.2
Rock Springs, Wyo.	1,205.5
Point-of-Rock, Wyo.	1,225.2
Bitter Creek, Wyo.	1,256.9
Red Desert, Wyo.	1,279.5
Wamsutter, Wyo.	1,289.5
Daly's Ranch, Wyo.	1,320.5
Rawlins, Wyo.	1,334.5
Fort Steele, Wyo.	1,350.5
Hanna, Wyo.	1,379.5
Medicine Bow, Wyo.	1,400.5
Rock River, Wyo.	1,424.5
Laramie, Wyo.	1,479.5
Tie Siding, Wyo.	1,498.1
Granite Canon, Wyo.	1,522.9
Cheyenne, Wyo.	1,543.9
Pine Bluff, Wyo.	1,587.9
Bushnell, Neb.	1,608.4
Kimball, Neb.	1,610.4
Sidney, Neb.	1,649.9
Chappell, Neb.	1,679.9
Bigspring, Neb.	1,716.9
Kortey, Neb.	1,743.9
North Platte, Neb.	1,785.3
Gothenburg, Neb.	1,835.3
Cozad, Neb.	1,849.8
Lexington, Neb.	1,868.3
Overton, Neb.	1,883.3
Boston-Frisco Sign, Neb.	1,904.2
Kearney, Neb.	1,908.3
Sheldon, Neb.	1,928.1
Alda, Neb.	1,948.3
Grand Island, Neb.	1,953.9
Columbus, Neb.	2,020.3
Fremont, Neb.	2,068.3
Omaha, Neb.	2,116.2
Missouri Valley, Iowa	2,137.3
Woodbine, Iowa	2,158.3



BY J. M. MURDOCK AFTER HIS FAMOUS TRIP FROM THE PACIFIC TO THE ATLANTIC

ACROSS THE AMERICAN CONTINENT

Denison, Iowa	2,192.7
Westside, Iowa	2,208.7
Carroll, Iowa	2,222.7
Glidden, Iowa	2,229.7
Scranton, Iowa	2,240.7
Jefferson, Iowa	2,252.7
Ogden, Iowa	2,273.7
Nevada, Iowa	2,310.7
State Center, Iowa	2,326.7
Marshalltown, Iowa	2,341.7
Montour, Iowa	2,354.7
Belle Plain, Iowa	2,382.7
Cedar Rapids, Iowa	2,422.7
Marion, Iowa	2,429.7
Mount Vernon, Iowa	2,447.7
Mechanicsville, Iowa	2,457.7
Clarence, Iowa	2,468.7
Wheatland, Iowa	2,481.7
Clinton, Iowa	2,517.7
Morrison, Ill	2,529.7
Dixon, Ill	2,549.7
Rochelle, Ill	2,552.7
Dekalb, Ill	2,588.7
St. Charles, Ill	2,616.7
Geneva, Ill	2,618.7
Wheaton, Ill	2,628.7
Chicago, Ill	2,658.7
Oakglen, Ill	2,687.5
Hobart, Ind	2,704.6
Michigan City, Ind	2,739.0
South Bend, Ind	2,765.7
Goshen, Ind	2,802.1
Ligonier, Ind	2,820.3
Wawaka, Ind	2,827.1
Brimfield, Ind	2,833.6
Waterloo, Ind	2,855.9
Bryan, Ohio	2,883.7
Archbold, Ohio	2,899.4
Swanton, Ohio	2,925.4
Toledo, Ohio	2,952.8
Woodville, Ohio	2,973.8
Freemont, Ohio	2,988.1
Bellevue, Ohio	3,004.6
Norwalk, Ohio	3,018.3
Kipton, Ohio	3,037.3
Oberlin, Ohio	3,043.1
Elyria, Ohio	3,052.6
Cleveland, Ohio	3,079.3
Chagrin Falls, Ohio	3,094.1
Troy, Ohio	3,113.3
Ralston, Ohio	3,117.3
Warren, Ohio	3,143.2
Youngstown, Ohio	3,157.7
Petersburg, Ohio	3,172.2
Ohio-Pennsylvania Line	.....
Beaver Falls, Pa	3,176.7
Pittsburg, Pa	3,221.2
Youngstown, Pa	.....
Jenners, Pa	.....
Johnstown, Pa	3,300.2
Windber, Pa	3,308.7
New Paris, Pa	.....
Fishertown, Pa	3,339.1
Bedford, Pa	.....
Everett, Pa	.....
McConnellsburg, Pa	3,374.2
Fort Loudon, Pa	.....
Chambersburg, Pa	3,396.2
Gettysburg, Pa	.....
New Oxford, Pa	3,431.4
Abbottstown, Pa	3,435.9
York, Pa	.....
Wrightesville, Pa	.....
Lancaster, Pa	3,475.0
Coatesville, Pa	3,502.5
Downingtown, Pa	3,508.2
City Line, Pa	3,536.2
Philadelphia, Pa	3,544.4
Burlington, N. J	3,565.0
Newark, N. J	3,639.0
Broadway, New York City	3,657.8

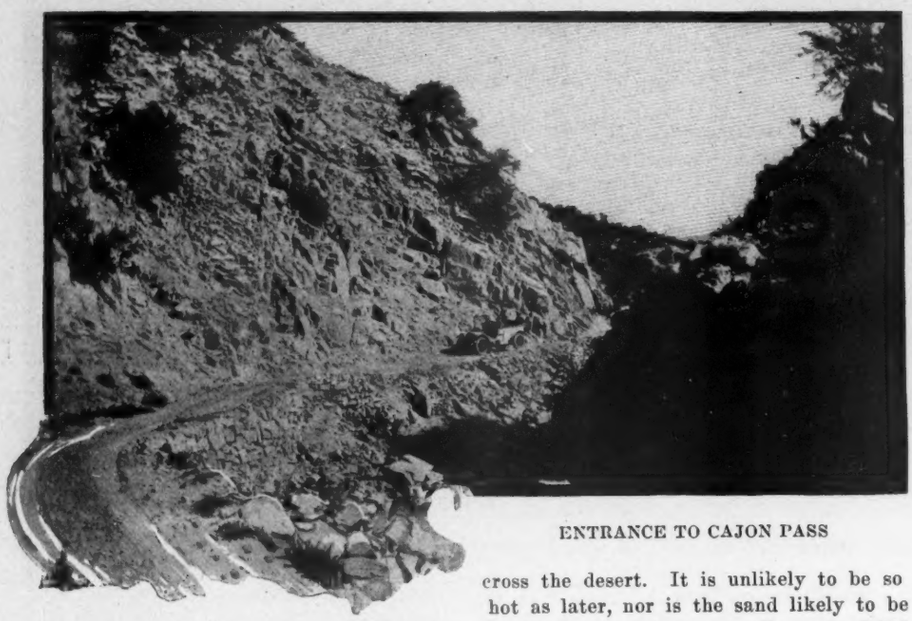
When you are bumping along over the hard spots in the middle of the desert without a single sign of habitation, there comes over you a peculiar feeling, not to mention some little worrying, as to what the result would be if any serious accident should occur in such a remote district. After some days have been spent traveling far away from the railroad, through an uninhabited desert country, it is only natural that we should have a longing for civilization and a desire to take any road, no matter how bad, so long as it does not go too far out of sight of the railroad. In giving advice as to the general arrangements, along with some of our experiences, it is with the hope that it will serve to make the preliminary plans of such a trip more complete and valuable.

Idea of the Tour

When I finally decided to attempt this trip I had in mind just one thing: to successfully demonstrate that it was possible for one person to drive a touring car, with its usual equipment of a cape cart top, side curtains, glass windshield, speedometer, and such other extras as had been discarded on trips across the continent up to this time, and I wanted, in place of the usual company of all athletic male members, to substitute, in their stead, my family, which included three women, making seven persons in all. The extra baggage required for parties with a personnel such as ours greatly increased our load. I had but little fear that the car would carry us successfully if we were able to stay with it. I thought that there must be a fair road all the way across the continent, and that it only remained for us to find it. I told my family that I felt I could drive as many hours each day as they were able to ride, therefore I intended to drive all the way myself, which feat I accomplished.

With these thoughts in mind, we, void of all superstition, made our start on a Friday morning. Instead of being attended by bad luck, we were seemingly met on every hand by the reverse, for we reached our destination nearly a month in advance of what our highest expectations had allowed.

ONE OF THE FIFTY-SEVEN FORDS IN SAN FRANCISQUITE CANON



ENTRANCE TO CAJON PASS

I remember making the remark, on our arrival at New York, that, within a few years, similar trips would be of such frequent occurrence that they would be scarcely worthy of mention. Just how true this prophecy was is shown by the fact that in one day last summer no fewer than six cars passed through Evanston, Wyo., all transcontinental bound. Each year, as the country becomes more thickly settled, and as the roads become more clearly defined, this travel will increase; and, as the travel increases, just so will the demand for better roads increase until our realization of a coast-to-coast road has been made possible.

Arranging Tour Plans

In contemplating a trip we might divide our plans under three heads:

First—The Season.

Second—The Route.

Third—Water. Just why we give a subdivision to water alone will be seen later on.

Fourth—Supplies.

The best season, of course, is during the early summer, about the month of May, because that is the best season to cross the desert. It is unlikely to be so hot as later, nor is the sand likely to be so deep. As we have well on to 1,000 miles of this so-called desert, it is well to give to it any preference possible. Later in the summer it becomes very hot, not only in the desert but in the middle west as well. Winter conditions are unfavorable and impracticable, so far as a family tour is concerned. While May is perhaps the most favorable month, yet any time between the first of April and the end of October is feasible.

Much has been written on the matter of a route; but that greatest of all transcontinentalists, L. L. Whitman, who has made the trip more often than any one and who has made the closest study of all the routes, is the authority that the route given with this article is the best. Now don't be deceived into thinking you will try another longer one, for if you undertake this trip you will find the shortest and best route long enough and bad enough before you finish. Truly, it is a long, hard grind, destined to test one's enthusiasm and endurance to its fullest limit before you reach the end.

While this route differs from the route followed by us on our trip, yet, inasmuch as I have been over both the old route as well as the new, I can cheerfully recommend that given with this article as the best.

Three years ago the only known passable route between Los Angeles and Goldfield was via Daggett, and Cave Springs, across the southern end of Death valley. Since the work on the Owens river acqueduct for the city of Los Angeles has been started, the Daggett route has been abandoned for what is known as the Owens river route. This goes north of Death valley, thus avoiding the only really dangerous part of the journey. On the newer route, in place of water wells being located 40 to 60 miles apart, as was the case on the old route, there is water to be had every 20 to 30 miles.

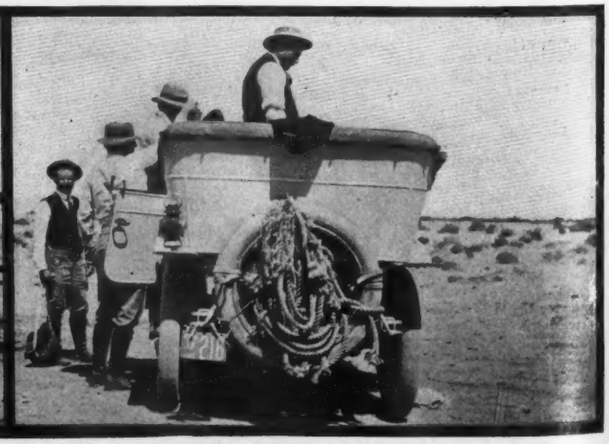
Crossing Death Valley

As to our experience in crossing Death valley, some words written by one of the women of our party may be interesting, and are here given:

"There is a spot within the limits of the more remote part of the state of California, lying in the southeastern part, known as Death valley, that is one of the hottest, driest, most desolate places in the whole world. At the place where we crossed it on our way from Los Angeles to New York by motor, it is 40 feet below sea level, and surely no other place in the valley could be hotter, drier and more desolate. There is absolutely no vegetation anywhere on the wide stretching desert, except low tuft sage brush, or an occasional stunted cactus plant. On three sides, the great desert valley slopes gently into mountain ranges; that known as Funeral range, the highest and most distant of which is capped with snow. On the fourth side, dusty green sage brush stretches away for miles and miles, until it seems to meet the hot blue sky. The only water in the valley fairly boils in the soft beds of tiny alkali streams.

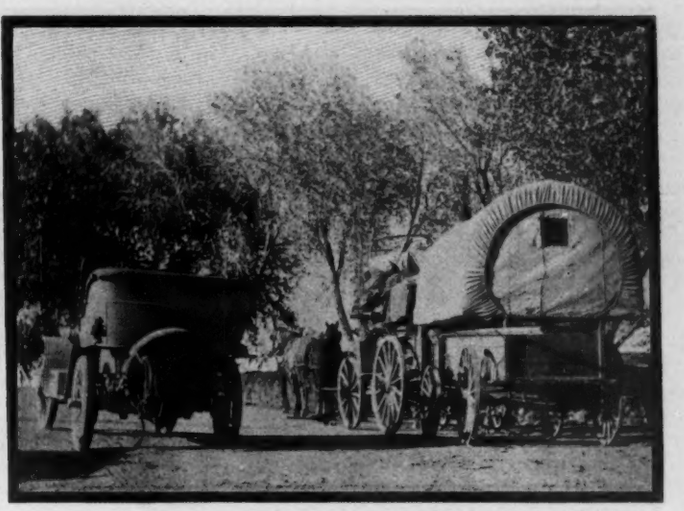
"It was beside one of these streams, with its shallow, almost stagnant bit of water, that we stopped one day near noontime late in April. Three hours before we had descended from the top of one of the big bare mountains behind us into the wild, uninhabited valley. We had not

MOJAVE DESERT NEAR VICTORVILLE



READY TO CROSS THE MOJAVE DESERT

COYOTE WELLS IN MOJAVE DESERT



STREET SCENE IN INDEPENDENCE

only left the last sign of habitation, Cave Springs Camp, 12 miles behind us, but we had lost even the faintest trace of civilization. Roads in that part of the west always are good and bad, according to how well and how poorly defined they are. Even in such a colloquial sense of the word, the faint path we had been following could scarcely be called good. For 3 hours we bumped and shoveled our way ever so slowly, under the scorching rays of the sun; even with heavy ropes wrapped around the wheels of the car, and the engine's rushing whirring at full speed, we could not force the car forward. The two other men of the party either shoveled sand from under the wheels, trying in vain to reach more solid footing, or stretched strips of canvas over the sand, in hopes that they might afford firmer hold for the jumping wheels, but it was slow work. As noontime drew near, the sun got so hot that it almost burnt the seat covers, so we had to put up the top; of course, this hindered traveling even more, but we could not endure the withering sun, even at such a cost.

A Desert Luncheon

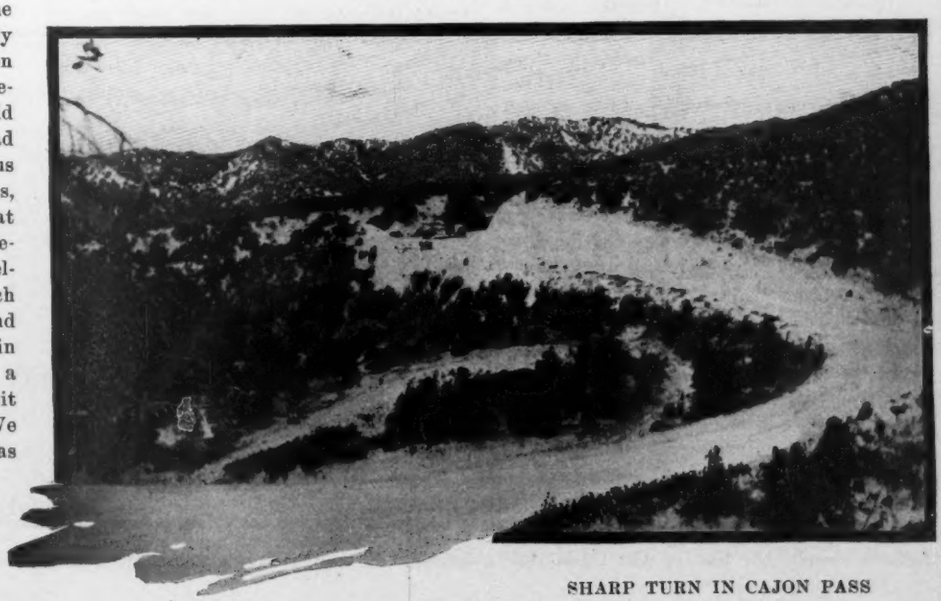
"Just about noontime we had come to one of the very few wet streams in the valley. By this time we knew absolutely nothing of where we were. We had been pushing ahead in hopes of coming to something or some place. As to how we could get out of the terrible valley, we had no idea, but we had provisions to last us seven days, pure water in our canteens, and we had stopped beside water that could be boiled if necessity should demand. The machine would afford us shelter from severe weather. With this much in our favor, we decided that the end had not yet come, even if we were in Death valley. When we had finished a scanty luncheon of crackers, cheese, fruit and olives, a high wind had arisen. We had to put the side curtains on the car, as a protection from the whirlwinds of sand that rushed about under the blazing sun. To add to our discomfort, several great sand dunes loomed up not far from us. As these dunes moved about with the winds, we could not be entirely sure that they would not move towards us at any minute. However, they remained in their places, despite the wild efforts of the hot, dry wind to upturn the whole valley.

Dangers of Being Lost

"In vain we scanned the great desert in hopes of a trace of a road, or even some lesser sign of civilization, but none could we find. Limitless, lifeless, sand and sage brush stretched all about us. With the aid of a compass and a brief road map, we figured out that there ought to be a little camp and, perhaps, a railroad somewhere to the left of us. But when we got out our field glasses and scanned the horizon and could find no trace of anything behind us except miles of terrible, threatening sand, which we had labored through and which it would have been folly to attack again, and which separated us from the living world, we realized our danger. But, we felt, that, impossible as it seemed, we would find a way out of the terrible valley in some way.

"We determined to find some sign of a camp or a road, or even a telegraph pole, somewhere, if it was to be found. So, having again consulted the map and searched in vain for even the slightest trace of man, we decided that two of the men of our party would start out on foot to find a way, but not to lose sight of the machine and the rest of the party even for an instant. We all knew that that would doubtless mean final separation from the party, and perhaps death. Of course, we experienced terrible suspense, nor were our thoughts cheerful ones. But we remembered that in such a time everyone has to appear cheerful just to try to keep up the spirit of the others. Even the women in our party seemed to realize that, although they did not quite realize the danger of being lost in such a place as Death valley.

"After a search of some 2 hours, we were all somewhat cheered with the report that one of our party had seen what looked like a railroad, far to the northeast. So, when we had rested a little, had eaten another lunch and all had been made ready for departure from the hated spot, we turned the Packard up the pebbly bed of the little stream. Where a



SHARP TURN IN CAJON PASS

PANORAMIC VIEW OF DEATH VALLEY TAKEN FROM A POINT 1000 FEET ABOVE THE FLOOR OF THE VALLEY. THE MOUNTAIN RANGE IN THE FAR DISTANCE IS FUNERAL RANGE. THE EAST SIDE OF THE VALLEY, THE WIDE, WHITE STREAK, IS THE FLOOR OF THE VALLEY AND ABOUT 8 MILES WIDE. THERE IS A SERIES OF CANONS AND MOUNTAIN RANGES BETWEEN THAT AND THE POINT FROM WHICH THE PICTURE WAS TAKEN. FUNERAL RANGE IS ABOUT 20 MILES FROM THE POINT

stray railroad track had signaled to us, across the great hot plains of Death valley, we sought for a road to the world of man.''

Now as to maps. As local information may be had to supplement them, pilots are unnecessary. Road maps of southern California, Nevada, Utah and Wyoming, such as they are, may be had at the large book stores. A United States government map of the Mojava desert may be obtained from the government. These, with the aid of a compass, an odometer and local directions, will enable you to find your way through the first 1,000 miles to Ogden. After leaving Ogden the route follows closely the line of the Union Pacific and the Chicago and Northwestern railroads to Chicago, so that little trouble is experienced in finding one's way between these points.

The most of the so-called roads west of Cheyenne are mere trails. In many places, where the roads have been clear, they are not available on account of the erection of wire fences around the ranches. These wire fences cross the road at many unexpected places. So it is a common thing to have to make new trails through the sage brush and over washouts. None of the roads is sufficiently traveled to wear the surface down for more than two tracks where the wheels and the horses run. As all vehicles of the west are 5-foot-1½-inch gauge, as against our 4-foot-8½-inch, it causes one wheel of the machine to climb along the side of one of the ruts. Sage brush grows between the ruts and there are no single horse rigs to tramp it down. It is easily seen, then, that constant care must be taken at all times for the protection of the flywheel. On account of this we were held up as many as a dozen times a day on our trip; but, as the soil is generally soft, we always managed to drag the car off without damage, except to the pan. The pan was repeatedly torn and battered against the flywheel, necessitating frequent stops to straighten it out. Both at Ogden and Cheyenne we had it removed and repaired. The care of this pan and flywheel is one of the greatest concern all day long. As the flywheel is one of the most vulnerable parts of the car, and one of the least protected, it requires constant care on the part of the driver, and even then he is almost certain to give it some hard knocks. At the bottom of the many grades there are washouts about a foot deep and 2 to 5 feet wide across the road. It is well to be on the watch for these, as they are frequently invisible on account of the sage brush until you are right on it.

Always Carry Water

It will be difficult to impress on the average easterner who reads this the importance of always carrying a full and ample supply of water for the motor, as well as for the personal use of those in the party. The reason for that is that we who have always lived in the country where we have water on every hand do not realize what the word ''water'' means on the desert. Well do I recall my first trip, made a few years ago, out on the desert of lower California. Every one whom I met directed me where to find water, though I had not asked this of them. On my return, I remarked that most cars that had been out over that road must have had hot engines, for everybody told me where to find water, whereas we did not need any. Fortunately for us, on this trip we had no need to look for water. But when one stops to consider that, on the preliminary trip, with a party of three men and two women we made a 46-mile run across the Mojava desert, over a route that had no inhabitants the entire distance, with but one water well on the route, without a drop of water in the car, it can be readily seen that the least delay or breakdown of our car would have left us stranded, to walk 20 miles without water, over a hot desert road, with the thermometer at between 110 to 115 degrees.

It is approximately 1,000 miles from Los Angeles to Ogden, then another 600 miles to Cheyenne—and this entire distance is through what may be termed as

a dry country. Across southern California, Nevada and Utah the water stations are seldom at more frequent intervals than 30 to 40 miles. Through Wyoming the intervals are slightly less, as the water can be had at the stations along the Union Pacific lines. Then take into account the possibility of going an additional 20 miles on the wrong road, with the possibility of some slight delay, for some unexpected reason, and it is not hard to appreciate why I would urge so much stress on this subject.

I would suggest that water be carried in a number of vessels. We carried 7 gallons, distributed in four vessels, so that, had one of them sprung a leak, we would have had the others in reserve. Of all the supplies water is the most important.

Equipment for the Trip

East of Cheyenne one might make the run in perfect safety, and carry no more than on any ordinary tour through the eastern states. The extra equipment recommended here is intended to cover that portion of the journey lying between the Pacific coast and Cheyenne.

A full equipment of extra tires, consisting of two or four extra casings, six to ten extra inner tubes, should be carried. All of these should be interchangeable.

A stock of but very few extra parts, as these are not likely to be needed.

A small winch for pulling the car out of bad holes. We used ours once only, but that once saved us a 5-mile walk to the nearest town, and at least a half day's delay. This winch consists of a drum, much like that used by house-movers, but smaller. The two hickory pries carried on the side of the car form the arms of the drum and fit into sockets on the side of it, so that one or two men, by walking round this, wind up the rope, wrapped three times around the drum and held by one man. The drum revolves on a 5-foot steel shaft, driven into the ground and supported by two guy ropes attached to two shorter steel shafts, also driven into the ground, about 10 feet in the rear. Before we left the coast we tried it out by putting the car into the worst sand we could find. With the machine buried to the top of the hubs, and the brakes set hard, the windlass never failed to lift the car to solid ground. So, before we started, we know the drum device was a success. The whole apparatus weighs but a hundred pounds and it was well worth carrying. One or two hickory poles strapped to the side of the car came in very handy for prying out of bad ruts.

A long-handled shovel, strapped to long poles on side of the car, beats your bare hands for digging, and if party is composed or four persons, make it two shovels, as these are sure to be brought into use many times daily, in shoveling the car out of bad dry washes, irrigation ditches and sand drifts.

A camper's ax comes in handy, in case repairs have to be made, and is a necessity in making camp.

Two or four water canteens of 1 and 2 gallons' capacity each may be hung on the lamp brackets.

Two emergency 1-gallon cans of cylinder oil can be strapped to the running boards.

One hundred feet of 1½-inch manila rope with which to wrap the rear wheels when deep sand is encountered. It is the only thing with which we could successfully work our way through the deep sand. We tried strips of canvas but could make no headway with them. When you go to the store to buy this do not be misled by its seeming much too big. It won't look nearly so big when it is half buried in a sample of the real desert drift sand as it does when you look at it on the store counter. A good way to wrap the wheels is to tie one end of the rope to a spoke of the wheel, then wrap it round and round the entire rim and tire, and tie the other end to the hub of the wheel. This gives a good chance to draw it tight before fastening to the hub.

A folding camp stove and small camp outfit with blankets and other sleeping outfit will be found very desirable, and will prevent much worrying as to whether the proposed stopping place for the night can be made.

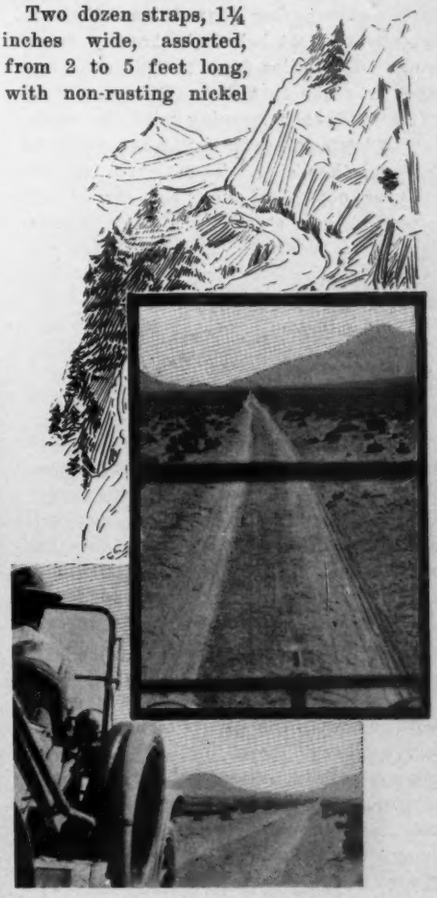
A bunch of baled hay wire is very convenient for making a temporary repair.

All through the west gasoline may be had in light wooden cases, each case containing two 5-gallon cans. These cases are light and convenient to carry and may be strapped to the running boards. At one time on our trip we carried 25 gallons extra gasoline in this manner. Not until we reached Chicago did we discard one case of two cans.

Never Overlook Supplies

It is a good rule to take on gasoline, water and oil frequently, when there is an opportunity, and to inquire, when taking it on, as to the next point ahead where a new supply may be obtained. I never asked a dealer where I could next get supplies that he did not tell me correctly. With but two exceptions gasoline and oil may be obtained every 100 miles. The two exceptions referred to are between Los Angeles and Goldfield, a distance of about 500 miles, when one must carry a greater than 100-mile supply; the other is between Tonopah and Ely, Nev., a distance of 240 miles, where gasoline and oil must be carried for the entire distance. I know of none to be had between these two points. There is no need to ship either gasoline or oil in advance.

Two dozen straps, 1¼ inches wide, assorted, from 2 to 5 feet long, with non-rusting nickel



ON THE TRAIL—TWO MODES OF TRANSPORTATION

buckles, we found very convenient for strapping articles to the car. Sometimes we had only a few of them in use, other times they were all in use. We carried them on the oil lamp brackets, so as to be within easy reach. On such a trip don't pack anything you want to use under the back seat or in any other inaccessible place, for you will need it too often. Keep everything where you can readily get at it.

A supply of substantial food should be carried to sustain the party 2 or 3 days at least. We carried a 7 days' supply, but so much is not now necessary, as the route north of Death valley is more thickly populated.

We carried a box with hinged lid as our commissary box, in which we packed all our provisions—so they were always kept clean and dry during wet weather. On our trip we carried fresh bread, butter, salt, sugar, coffee, tea, bacon, eggs, crackers, canned apricots, peaches and tomatoes, sardines, flour and marmalade. These were replenished from time to time all the way to Omaha. East of Omaha we had no occasion to depend on our commissary box.

The Driving Schedule

It is well to make no definite driving schedule, for the roads and conditions to be encountered each day are so varied that it is impossible to reckon the days by mile. Some of our hardest days showed the smallest mileage. I know nothing more disheartening than to see the sun just about to set below the horizon, when one is many miles from the place he had hoped to make that day. It is much better to start each morning with the intention to keep going until you are ready to stop and then stop. Then, again, do not set your objective point too far ahead; better, if you start from Los Angeles, make Ogden your first one; then when you reach Ogden make your next objective point Cheyenne; then Omaha, then Chicago, etc. It won't look so far away and it will serve to let you concentrate your mind on the immediate distance ahead.

A Word in Conclusion

In conclusion, let me say just one word of encouragement. If you are an enthusiast, and have the time, make your preparation and make the trip, and you will have the opportunity of seeing this big country of ours in a way in which you can never see it from a railroad train; some day when things look their worst—and that day is sure to come if you undertake to drive a motor car across the continent—when you are ready to give up in despair, and when the matter of making further headway seems entirely hopeless, open up your commissary box and eat a hearty lunch. Then lie down on the warm sand and either think or sleep a few minutes, and you will be ready to start off with renewed vigor, and you will find that no matter how hard it seemed, nothing is impossible.

Long Ocean to Ocean Trail Is Blazed

Philadelphians Celebrate Completion of Transcontinental Motor Journey by Dipping Front Wheels of Their Premiers in the Pacific After Which the Californians Banquet Them

LOS ANGELES, Cal., Aug. 12—The ten Premier touring cars, filled with pleasure motorists, that crossed the continent from Atlantic City, have been immersed in the surf of the great Pacific ocean, after having been washed in the waves of the Atlantic at the start. The last stain of dust of the great American desert, the water marks of Wyoming and the mud of Colorado roads were removed this afternoon at the City of Venice park, where the transcontinental cars were not only dipped but were washed thoroughly. They emerged from their baths apparently competent to repeat their recent record-breaking run.

Finish of the Tour

Thousands of motoring enthusiasts witnessed the immersion and cheered themselves hoarse when the brass bands were not engaged in making music. The cars were run into the ocean under their own power and by their own amateur-owner drivers on a plank chute that was built from the cement walk into the surf. More than 2,000 motor cars were parked in the open air garage in full view of the ceremony and thousands occupied places of vantage on the pier and Ship hotel, which is situated at the left of the pier out upon the water about 1,000 feet from the shore. After the dipping of the ocean-to-ocean cars they were arranged directly in front of the entrance of the hotel and no other cars were permitted on the pier.

All of the forty-odd occupants of the transcontinental cars on their ocean-to-ocean journey, including the eight women and two boy scouts, were in their seats when the cars were dipped and the experience was one that was unusually enjoyable and has been felt by few. Participating in the final ceremonies were Mayor Alexander, the city council, board of supervisors and all city officials, together with the chamber of commerce, Automobile Club of Southern California and the Automobile Dealers' Association.

Boy Scouts in Evidence

The boy scouts of Los Angeles and their brass band, with mounted police and the mayor, escorted the ocean-to-ocean caravan to the City of Venice park, the transcontinental cars being arranged in touring order and carrying the flags presented by President Taft in Washington, and other flags of various states, obtained en route. The message carried by the boy scouts in the transcontinental party, headed by Master John G. Monihan, Jr., was delivered to the Los Angeles boy scouts at the ceremonies on the pier, following the dipping of the cars. Other features on this program included the delivery of the messages of the mayors of Atlantic City, Philadelphia and other cities to Mayor Alexander, of Los Angeles, and an appropriate address by the latter. An elaborate banquet for the tourists followed the ceremonies on the pier.

The completion of the ocean-to-ocean tour is marked by great rejoicing on the part of all the motorists on the Pacific coast from Vancouver, B. C., to San Diego. There is a general feeling that the Pacific and Atlantic coasts have been brought closer together and transcontinental touring by pleasure parties is now expected to become common since the first tour of this kind has been such an unqualified success. It has been proven that there are no unsurmountable difficulties in the way and when anticipated improvements have been made on the transcontinental motoring highway the trip is expected to be one of unusual pleasure.

Friendly Spirit of West

No proud emissaries of powerful governments ever received greater ovations than were given the ocean-to-ocean tourists at every point along the great route. Particularly was the friendly spirit manifest in the west. Westerners appreciate the importance of an improved transcontinental highway and they know it means millions of dollars to them. They will do everything in their power in the coming campaign to raise millions of dollars for the improvement of this road.

The transcontinental trip was greatly enjoyed by the eight women in the party and the few hardships they experienced were so novel as to be almost enjoyable. They did not mind sleeping in barns a couple of nights. Countess De Calatrava, a Spanish noblewoman in the party, was particularly impressed. Speaking for the others of her sex, she said:

"Transcontinental touring is wonderful and I never expect to have another experience so enjoyable. Of course, we received more attention than will be given any succeeding party for the reason that we were doing something new. However, a party the size of ours will attract much attention for some time to come on a trip of this kind. The injunction to see America first certainly is timely. If Americans knew better what they possess at home they would never go abroad until they have enjoyed their own wonders. Europe has nothing that eclipses the grandeur of the Rockies or the quiet beauty of the western prairies. I hope to make another ocean-to-ocean motor car trip before long under greatly improved road conditions. All the women in the party greatly enjoyed the experiences of

Transcontinental Journey Enjoyable

Easterners So Pleased With Their Experiences They Are Talking of Trying It Again Next Year—Tour Undoubtedly Will Be Beneficial to the Good Roads Cause—Campaign On

the trip, and none can speak in terms of praise sufficiently high to express their feelings. All are thankful for the opportunity that enabled them to be passengers in the Premier caravan.''

Tourists at Banquet

John G. Monihan, manager of the tour, at the banquet following the immersion of the cars, briefly recounted some of the incidents of the trip and pointed out the fact that all the ten touring cars that left Atlantic City June 26 and the prairie schooner baggage car, and pilot car driven by Ray McNamara, came through with no more mechanical trouble than ordinarily would be encountered on a run of 6 hours instead of 6 weeks, a larger portion of which was spent in practically trackless and unexplored regions. It was predicted that every car in the caravan could make the return trip in the same manner. However, that is not the plan, as the transcontinental cars will be shipped back to New York and Philadelphia by freight and the passengers will return in Pullmans. Had the tourists known they were to get through in such fine shape, however, it is said they probably would have made their plans to return in their cars.

In the party are some of the most prominent business men of New York and Philadelphia, who have given all the time they can spare to their vacation and they will now hurry back to their places of business. They will be ready again to take the wheel when the cars arrive home by the slower freight trains.

Those in the Party

The men in the party are unanimously extravagant in their praise of the tour and the manner in which it was handled. George C. Allen, president of the Republic Trust Co., of Philadelphia, who was treasurer of the entire party, paid all the bills; John H. Murphy, city commissioner of New York; C. G. A. Loder, who established the legal status of the anti-Sherman trust law; C. Francis Jenkins, the Franklin Institute gold medalist, who invented the moving picture machine; F. H. Lippincott, of the famous Lippincott family; P. W. Baker and S. M. Root, prominent tobacco brokers; F. E. Moller, son of a retired banker; Elsworth Sprague and other well-known easterners drove their own Premiers every foot of the way across the country and all were more enthusiastic at the finish than at the start. Many of them were accompanied by wives and families.

The transcontinental caravan arrived at Los Angeles Thursday and the tourists have been feted and entertained lavishly. Trips were made to the beautiful and world-famous Mt. Lowe and to Catalina island.

Disbandment of the party will be accompanied by many regrets, but this will be decreased by the fact that the tourists are close friends in Philadelphia and New York, and before the touring season is over they expect to arrange several other events. Already they are talking of repeating their transcontinental run next year, and it is not improbable that it will be made an annual event.

IOWA DIVIDING THE TAX

Des Moines, Iowa, Aug. 15—Iowa will get $95,000 for good roads as the first share in the fund created by the motor tax law created by the last legislature. The new law went into effect July 4 and State Treasurer Morrow is now drawing the warrants for the different townships in the ninety-nine counties of the state.

Every civil township in the state will receive $57.57 as its share in the first division of the fund. The exact amount of the money to be used for the good roads work is $94,587.51. The total amount of the fund created by the first effect of the tax is $111,266.54. To defray the expenses of collecting the tax the state takes 15 per cent of this amount, which is $16,696.76. As the new number plates themselves cost the state $30,000 it is seen that the commonwealth is a big loser on the deal. State Treasurer Morrow who made the division charges that the ruling by Attorney General Cosson that the division should be made according to the civil townships instead of the congressional townships is grossly unfair. Despite the fact Des Moines, the capital and largest city of the state, pays more motor taxes than any other city in the state, it will not get a penny of the fund created. The law provides that all the money created by the new law shall be spent outside the corporate limits of the different cities.

WISCONSIN MEANS BUSINESS

Milwaukee, Wis., Aug. 14—''The knell of the road-working picnic has been tolled. We have passed the day when the working-out system of road taxes is advisable or feasible. Wisconsin has joined the ranks of the progressive states which have by systematic work produced admirable systems of highways.''

In these words John A. Hazelwood, of Jefferson, Wis., former state senator and chairman of the Wisconsin highway commission, created by the 1911 legislature, sounded the keynote of the board's future activities in an address before the Dodge county board of supervisors at Juneau, Wis., last week. It was the first public statement by a member of the commission and formally introduced state aid for highway construction.

Acting under the new law appropriating $350,000 each year to counties which expend an amount equal to their respective apportionments, the Dodge county board already has started a constructive program.

Up to this time roads have been built in a haphazard manner. A farmer could work out his poll tax by putting in 1 day on the highway. As a rule there was no organization and one or two farmers went on the road with teams and did more damage than good.

Wisconsin motorists and public-spirited citizens in general are determined to place this state on the proposed transcontinental highway. Without waiting for other interests behind the project to act, the Badger citizens have started work on selecting the best route from Milwaukee across the state to Prairie du Chien, on the Mississippi river, via Madison, the state capital. As soon as the best possible route is selected, it will be thoroughly marked and designated with signs and efforts will be made to improve such stretches as need work and to keep in good repair the roads already shaped up.

At Prairie du Chien the highway will be joined to the Iowa side at McGregor by means of an excellent ferry. A large steel bridge will be erected at these points as soon as the legislatures of the two states come to an agreement. Dependent upon the construction of this bridge is the purchase of one of the largest and most beautiful natural parks in America at the mouth of the Wisconsin river in Prairie du Chien, by the state.

HOOSIERS HAVE NEW IDEA

Indianapolis, Ind., Aug. 14—The board of jark commissioners has dismissed as impractical a plan proposed to organize a private company to complete the boulevard system of this city. Under this plan is was proposed the private company should issue $10,000,000 worth of bonds bearing 6 per cent interest and selling for 92½, the city to pay interest and the bonds at maturity in 50 years.

A new scheme, however, has been adopted by the board, and it will be presented formally to the mayor and city council within the next few days. The board proposes to issue $500,000 worth of bonds to run 30 years and bear 4 per cent interest, the money thus derived to be used in the acquisition of ground for boulevards. For construction work the board proposes to levy an assessment of $100,000 a year on the various park districts and a tax levy of 9 cents on each $100 of taxables. The tax levy would net $198,000 a year. By buying practically all of the more important ground along the banks of streams it will need at one time, the board believes the city will save thousands of dollars.

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Gearing Big Cars Lower

SEVERAL manufacturers of high-priced machines, many of them six-cylinder cars are going to gear them lower for 1912 than they have been geared this year. These manufacturers are trying to give greater flexibility and less speed. Many of these cars have been able to show, it is claimed, as high as 70 miles per hour, others only 65 miles per hour and some but 60 miles per hour. For next season some of them will not be able to go over 55 miles per hour. This reduction in speed and increase in flexibility is a commendable move. It is one step in the suppression of the speed craze which has been so prominent during the last few years. It is one step, and an important one, in the reduction of work in driving a car. With the more flexible car the changing of gears for slight grades, or making sharp turns in a city, or congestions of traffic will be greatly reduced and the consequent amount of work on the owner-driver reduced. But this increase in flexibility goes further: In cities it reduces the noise consequent upon changing gears in not a few models; it means that the burring up of the ends of the teeth on shifting gears is reduced; and, in fact, it means a great deal in the general conservation of the car parts.

A REDUCTION in the speed of the car is sensible. Scores of owner-drivers have stated that the car they own has averaged over 70 miles per hour in races but that they have never had it over 50 miles per hour and further that they are afraid to drive much faster on ordinary roads. They are correct when they say it means grave chances to go at much faster than this on country roads where the exact surface is not accurately known and where the road condition can change from day to day. The question naturally arises then, What is the use of the other 20 miles per hour to the ordinary owner-driver? It is not any use. The extra power undoubtedly comes into play on steep hills, in sand or at other times, but the same power can be brought into use by a lower gear ratio, and the owner-driver has the advantage of the increased flexibility afforded, an advantage which he is sure to appreciate in the long run.

HIGH speeds have worked havoc to many owners. They have not known exactly how to handle a high-speed machine. It is easy to control a car up to 50 miles per hour but over this speed the task becomes a bigger one on many roads and with many cars. The driver has so few opportunities to get the car up to this speed that the amount of practice at such speeds is not enough to produce efficiency in driving. The result is that if an exigency arises when traveling at such speeds there is great danger of a serious accident or perhaps a fatality.

THERE is still one other great advantage to the reduction of speed and that is the reduction in upkeep cost of the car. High speeds mean high tire upkeep, heavy wear and tear on all of the car parts, etc. With lower speeds the cost of car operation will be reduced. This is very desirable at the present time when many driver-owners are gravely discussing the cost of car operation and particularly so with high-priced machines. Whatever can be done to reduce operating cost and not hamper the utility field of operation should be done. This act will greatly benefit the big-car field. The benefit will not come in an instant, but it will surely come and will do a great good. When it does come the makers will be among those benefited.

TO go still further: Reduction in speed will perhaps result in reduced antipathy of the police. The police situation is the most unjust one of the day. The authorities place the speed limits at 12, 15, 18 miles per hour or some other absurd figure; then the chiefs or superintendents announce not to arrest anyone going not over 20 miles per hour; but one day a private owner going too fast has an accident, strikes a tree and perhaps kills one of his party. The papers are flooded with the episode and a new order is sent out from the police headquarters to arrest all exceeding the 15-mile-per-hour limit. The result is that the conservative driver going his 18 miles per hour is arrested, notwithstanding the fact that he has been driving for months at such a pace. If he has a pull he gets off, but otherwise he pays his $25 or $50 with costs. This situation is damaging to the motor interests, and if the reduction in speed is made, the possibility of accidents will be reduced and the possibility of special arrest orders from police departments will be correspondingly reduced. The motor car maker is to be congratulated on taking this step which does not mean stopping of racing on speedways, special road courses or beaches, but a more legitimate use of the country highways.

Growth of the Roads Germ

UNCLE SAM always has shown a friendly interest in the good roads movement and even as far back as the cycling days he extended a helping hand on more than one occasion. Now he is considering going even farther and has in contemplation the construction of seven national highways extending throughout the country, all radiating from his official residence in Washington. There have been many similar schemes broached in congress in late years but this particular one seems to have a sounder basis than its predecessors, for the father of it is Senator Cullom of Illinois, a power in the higher branch of the national legislature.

UNDOUBTEDLY the government has the right idea but its success of course depends upon the backing it receives from congress. It is a stupendous undertaking at best and will require the expenditure of millions, but if it is undertaken one cannot question the good it will do motoring. Imagine national pikes taking in nearly all of the states in the union, maintained by government money and serving as examples for other sections. It will require at least $148,000,000 to do this and the question is, whether the law-makers will be scared off by the size of the bill. But there is a fine argument in the fact that in the past the government has thought little of spending vast sums for the improvement of inland waterways and in constructing the Panama canal. Therefore, why shouldn't your Uncle Samuel be willing to spend a few of his millions to help his people who do not travel on the water or who do not benefit by having canals? Certain it is that the road-users are in the vast majority and that the expenditure of $148,000,000 on national highways will be of greater benefit to the people of the United States than even the Panama canal,

SENATOR CULLOM'S backing of the bill should carry a great deal of weight, for Illinois also is interested in water transportation as was shown in the recent fight for the deep waterways system. If the senator is broad-minded enough to remember that many of his constituents need good roads more than they do deep waterways, then his colleagues should see that he is disinterested in the matter. Congress certainly can afford to investigate fully.

Seven National Highways Proposed

Senator Cullom Introduces Bill in Senate Providing for Gigantic System of Roads Radiating From Washington

WASHINGTON, D. C., Aug. 12—The most important good roads movement ever inaugurated in this country was begun this week when Senator Cullom, of Illinois, introduced a bill in the senate providing for a gigantic system of seven great national highways radiating from this city to all sections of the United States. Former Representative J. Floyd King, of Louisiana, at whose request the measure was introduced, immediately started a movement to further the project.

If the project is successful and with the backing it has it seems more than probable this city will become the center of a wheel of roads passing through practically every state in the union. Back of the project are a number of prominent members of congress and business men who are preparing to push the bill to passage as quickly as possible. Opposition is expected from some quarters, but General King informed Motor Age correspondent he was confident of overcoming it. He expects to secure the support of motorists in all sections of the country.

The Seven National Routes

The seven great national roads provided for in the plan will all have one terminus in Washington. The other extremities proposed are Portland, Me., Buffalo, N. Y., Seattle, Wash., San Francisco, San Diego, Cal., Austin, Tex., and Miami, Fla. The seven national roads will be known as the Washington national highway, running from this city to Portland, Me.; Roosevelt highway, Washington to Niagara Falls, passing through Gettysburg; Lincoln highway, direct to Chicago and thence to Seattle; Jefferson highway, running almost due west, traversing Virginia, West Virginia, Ohio, Indiana, Illinois, Iowa, Nebraska, Colorado, Utah, Nevada and California; Grant highway, direct to Memphis and thence southwest, through all the southwestern states to San Diego; Monroe highway, passing through most of the southern states to New Orleans and thence to Austin, Tex.; and the Lee highway, running along the Atlantic coast to Miami, Fla. The only states through which none of the roads will run, if the plan is adopted, are Vermont, Michigan, Wyoming, Oregon, Missouri and Kansas. It is probable the routes will be so changed that all of these states, with the exception of Michigan, will be included in the plan. Michigan is so situated between the great lakes it is impossible to include it.

The plan proposes that all of the national highways be macadamized. It also is proposed that the engineers in charge of the highway system make estimates for the building of roadways connecting the highways with all of the large cities of the country, and that the legislatures and city governments of the several states and cities be advised of these data and encourged to construct the connecting roadways. By means of this system of supplementary roadways it is proposed to extend over the entire nation a system of modern roads.

It is estimated the seven great highways proposed would not exceed a combined length of 12,000 miles, which at the estimate of $12,000 a mile, would bring the cost of the system up to the figure of $148,000,000. It is proposed that this money be raised by the issue of bonds. After the roads have been built, it is proposed to pay their cost of maintenance by the collection of tolls. This part of the project is one objectionable feature and is likely to be stricken out. The Cullom bill provides for an immediate expenditure of $2,000,000 for the preparation of maps, the making of surveys, and other work incidental to the work of actually beginning the construction of the great highway system. The bill also provides for the appointment of a commission to be known as the national interstate highways and good roads commission to determine the location and cost of the proposed seven highways.

Reasons for Uncle Sam

As reasons why the federal government should take hold of the highway project, Senator Cullom tells of the millions of dollars expended by the government in the improvement of the inland waterways, the Panama canal, and other great public improvements, and the large areas of land given to railroad companies for the construction of transcontinental railroads. The traffic in the United States has grown to such proportions, according to Senator Cullom, that the railroads and waterways are insufficient to care for it properly.

Coming Motor Events

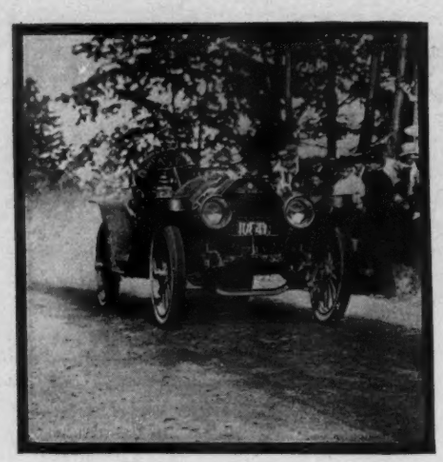
*August 8-17—Reliability for trucks, Chicago Evening American.
August 10-12-13—Races on Gearhart beach, Portland Automobile Club, Portland, Ore.
August 12—Reliability run of Quaker City Motor Club, Philadelphia.
August 17—St. Louis reliability run, Missouri Automobile Association.
*August 25-26—Elgin road races, Chicago Motor Club.
August 26-29—Reliability run from Oakland, Cal., to Lake Tahoe.
September 1—Oklahoma reliability run, Daily Oklahoman.
September 2-4—Brighton Beach races, New York.
September 2—Truck meet, Columbus, O.
September 2-12—Motor truck display, Milwaukee Industrial Exposition.
September 3-4-5—Social tour of E-M-F and Flanders owners, Indianapolis to Chicago.
September 6-9—Reliability run of Automobile Club of Buffalo.
September 7-8—Philadelphia track meet, Philadelphia Automobile Trade Association.
September 7-8-9—Track meet, Minnesota State Automobile Association, Hamline track, Minnesota.
September 7-10—Reliability run of Buffalo Automobile Club.
September 9—Hill climb at Port Jefferson, N. Y.
September 10—Liedekerke cup road race, Belgium.
September 12-13—Track meet, State Automobile Association, Grand Rapids, Mich.
September 15—Track meet, Appalachian exposition, Knoxville, Tenn.
September 16—Track meet, Automobile Club and Dealers, Syracuse, N. Y.
September 18-20—Reliability run for trucks of Chicago Motor Club, Chicago.
September 19-21-23—Reliability run, Burlington, Vt.
October 3-7—Track meet, Danbury, Conn., Agricultural Society.
October 6-13—Eight-day reliability run of Chicago Motor Club.
October 7—Fairmount Park road race, Philadelphia.
October 14—Santa Monica road races, Los Angeles, Cal.
October 15-25—Glidden tour, New York to Jacksonville.
October 16-18—Reliability run of Harrisburg Motor Club.
November 1—Track meet of Waco Automobile Club, Waco, Tex.
November 2-3-4—Reliability run of Quaker City Motor Club, Philadelphia.
November 9-11—Track meet, San Antonio Automobile Club.
November 4-6—Phoenix road race, Maricopa Automobile Club.
November 9—Track meet of Maricopa Automobile Club, Phoenix, Ariz.
November 27—Vanderbilt road race, Savannah, Ga.
November 30—Grand prix race, Savannah, Ga.
January 6-20—Madison Square Garden show, New York City, Automobile Board of Trade.
March 13-20—Show of Boston Commercial Motor Vehicle Dealers' Association, Mechanics' building, Boston.
January 1-7—Grand Central palace show of Automobile Manufacturers of America, New York City.
January 10-17—N. A. A. M. show in Grand Central Palace, New York.
January 27-February 10—N. A. A. M. show in Chicago.

*Sanction already issued

COST OF HAULING

Franklin, O., Aug. 14—"Four million dollars a year for the navy and not a dollar for roads is an infamous policy," declared Jesse Taylor of Jamestown, secretary of the Ohio Good Roads Federation, at the Miami Valley Chautauqua recently. Mr. Taylor continued:

"Up to date fourteen European nations have expended $5,000,000,000 for road construction and are appropriating $160,000,000 annually for road maintenance. The result of which is that the cost of hauling on public highways, per ton, is: In France, 10 cents; in England, 10 cents; in Belgium, 9½ cents, and in Germany, 8½ cents, while in the United States it is 23 cents, and on acount of present conditions of public roads in the United States our people are losing annually hundreds of millions in excess cost of transportation from the farms to the railroads, to which we must add another annual loss of millions due to incorrect and inadequate construction and want of maintenance."



JESSUP, BUICK, WORCESTER WINNER

WIGGINS, VELIE, WORCESTER WINNER

PILLING, KRIT, WORCESTER WINNER

WILCOX IN NATIONAL, STAR AT WORCESTER CLIMB

Ford Second Best in French Hill-Climb

American Car Takes Part in Mont Ventoux Event and Is Beaten Only by 100-Horsepower Cottin-Desgouttes, Which Fails to Break Old Record—Course 13 1-4 Miles in Length

PARIS, Aug. 8—Georges Deydier, driving the 100-horsepower Cottin-Desgouttes which took part in the recent grand prix, made the fastest time up Mont Ventoux, the longest and most difficult hill-climb held in France. He covered the 13¼ miles, with a rise in altitude of 5,246 feet and a maximum grade of 13 per cent, in 19 minutes 42⅖ seconds.

Old Record Stands

This is decidedly fast work, but it does not dispose of the record established a couple of years ago by Bablot in a Brasier who climbed the hill in 18 minutes 41 seconds. Mont Ventoux is the high water mark of European hill-climbing, being unusually difficult by reason of the long effort required of the cars and the numerous sharp turns to be negotiated. Starting from the village of Bedoin, at an altitude of 970 feet, the grade is at first easy, rising to 5 per cent after 3 miles, dropping for a short distance to 3 per cent, then mounting to 9 and 10 per cent, with but a few short distances at 7 and 8, and gradually increasing after the twelfth mile to 9, 10 and 13 per cent. To get up such a hill it is necessary not only that the car should be a sprinter, but a thorough stayer.

Ford Makes Fine Showing

After the Cottin-Desgouttes, the best work was done by Henry Depasse in the Ford car which he had prepared for the grand prix race at Le Mans and the light car race at Boulogne. The sporting committee kept him out of the former and a fatal accident out of the other two races; but he showed his quality at Mont Ventoux by climbing the hill in 22 minutes 19⅖ seconds, beating Gaste's six-cylinder racing Rossel and Boillot's Lion-Peugeot, which ran second in the light-car race.

Depasse had the disadvantage of not having been over the course before, but had the advantage over the others in the matter of weight, scaling only 1,328 pounds. In addition to coming second in the general classification, the Ford naturally finished first in its own class. Boillot, who was third on the list, climbed the hill in 23 minutes 30⅖ seconds, with the light car Lion-Peugeot racer equipped with a semi-touring body. He was followed by the big six-cylinder Rossel piloted by Gasté, who made poor time considering the power at his disposition, but this was largely accounted for by a lack of weight on the rear axle. Its time was 23 minutes 34 seconds.

Goux, in last year's long-stroke two-cylinder Lion-Peugeot racer, of rather less than 3 inches bore, made the fifth fastest time by climbing the hill in 25 minutes 3⅖ seconds. Sixth, seventh and eighth places were won by cars in the 3½-inch bore class, Narzaglia in an Aquila Italiana being timed in 28 minutes 17 seconds, Tangazzi in a Lancia in 30 minutes 21 seconds, and Fournier in a Pilain in 30 minutes 38 seconds.

The amateur driver De Vizcaya was looked upon to do fast work with the 2½-inch bore Bugatti weighing only 1,100 pounds all complete, but he punctured after covering half the distance, and finished with a flat tire and a broken front spring in 30 minutes 55 seconds. Juvanon on the Th. Schneider of 3.3 inches bore, finished tenth in the climb in 34 minutes 12 seconds.

Punctures Stop Two

A puncture destroyed all the chances of Porporato and the Gregoire racer which was built for and run in the Boulogne light-car race. He continued on the rim and was timed in 38 minutes 53 seconds. In the motor cycle section the best time was made by Louber on a Regence, which got up the hill in 33 minutes 38 seconds, beating a good field.

BELCHER IN KNOX, WHO DROVE WELL AT WORCESTER

PUGH IN NATIONAL

FLANDERS, A CLASS WINNER

HABICH IN THE COLE

Big Day for National at Worcester

Wilcox is Star Performer in Dead Horse Hill-Climb While His Team Mates Add to Glory of the Hoosier Concern—Belcher and Coffey in Knox Big Factors in Eastern Classic

WORCESTER, Mass., Aug. 15.—Four records were made in the sixth annual hill-climb of the Worcester Automobile Club held on Dead Horse hill here Saturday, with the National car taking three and the Cole 30 one, but for all the good time made in the uphill mile climb, the record of 54 seconds, made by Baldwin in a Stanley steamer 2 years ago, still stands.

Howard Wilcox, driving the big National, covered the course in a little more than a second slower than the Stanley's mark, thereby breaking the record for the hill for gasoline cars held by Caleb Bragg in a Fiat of :58 made last year. Besides lowering the record held by Caleb Bragg four times and making three other records, the National car took seven out of eight events, in which it was pitted against the fast Knox cars, and no fewer than four times did Wilcox send the National up the mile climb in less than a minute, which stunt also was equaled by the Knox, with Fred Belcher at the wheel.

Hill in Poor Condition

The big cars found the hill in poor condition when they were sent up the mile climb in the big events of the day, as the cars in the early events had cut ruts in the surface, and there were spots that the drivers of the fast machines found dangerous, causing them to shut off power. The top of the hill near the finish line was the poorest part and the drivers in each of the star events found that they had to make time at the start if they wanted to be in the going. This did not apply to the Stanley steamer, holder of the hill record, for although getting an excellent start in each event in which it was entered, it covered the mile in but a few seconds over the minute mark, and not once did it come within 5 seconds of the best time made by the National or within 3 seconds of the Knox six.

Knox Pushes the National

As was expected, the fight for premier honors Saturday was between the National and Knox cars, with the former making a clean sweep, taking seven events. The purple cars did not have an easy time of it, for the Knox crew pushed them in every event for the honors, and it was only fractions of a second that separated them, especially in the events in which the two stars of the big meet, Howard S. Wilcox and Fred W. Belcher, were contestants. Wilcox handled a big National four-cylinder with a piston displacement of 587 cubic inches, while Belcher's six-cylinder Knox had a piston displacement of 589 cubic inches. Despite the fact that the piston displacement was almost the same between the National and Knox, the result of the uphill race proved that the four-cylinder car was the faster car on hills.

Wilcox's driving had much to do with the National car's victories, for he guided the big machine to six victories, which record never has before been equaled by any driver on Dead Horse hill, and it is doubtful if any driver ever performed the same feat at any hill-climb. John W. Rutherford, the New York amateur driver, won the seventh event for the National car and finished second and third in the other two events in which he was not in the front. His time for the three trials up the hill did not vary a second.

The Knox cars made a splendid showing on the steep climb. The time would have been good enough to win in previous years but the speedy Nationals were too fast. Fred W. Belcher did the best work for the Knox camp and his best time, :56.3, was less than a second slower than Wilcox's record.

The climb Saturday was surely a National one, for while Wilcox was easily the

star, the other members of the National camp, Frederick E. Randall of Boston, John M. Rutherford of New York and John Pugh, all did excellent work, piloting Nationals to victory seven times, two seconds, three thirds and one fourth, out of thirteen starts, and in the event in which the National finished fourth, the first and second cars were other Nationals and the third a Knox six.

While the National and Knox did fine work as far as time was concerned, there were a number of other lighter cars that did excellent work also—the little Flanders 20 climbing the steep mile grade in 1:18⅗, which time several higher-priced cars and one six-cylinder model failed to beat. The little Cole 30 was another of the light cars to make an excellent showing, winning two firsts and a second from good fields.

Johnny Jenkins, in the class calling for cars of piston displacement in 231 to 300 cubic inches, with no weight restrictions, made the climb in 1:16⅘, a new record for the Dead Horse hill for cars of this class, while in the same event H. J. Habich of Boston sent a Cole 30 over the course in 1:21, and in another class, with a minimum weight restriction placed upon the Cole, Jenkins covered the grade in 1:17⅘, winning the event.

The Oakland took two firsts, while the Hudson, Krit, Knox and Buick had clear sailing in the events in which they were winners, having no other cars entered in the events. The other winners were the Flanders 20, Stanley steamer and Velie. Frank Witt drove the Flanders and he went up the steep grade so fast that his time of 1:18.85 compares favorably with the performances of the bigger cars. The former record for a car of the same class and piston displacement was 2:05⅕, made by a Buick in the Dead Horse hill climb two years ago.

Stock Cars Climb Well

The stock car event for cars selling for $2,001 to $3,000 was a remarkable one. The three cars entered in the event broke the former record of 1:14⅘, made by a Chalmers 3 years ago, with John M. Rutherford of New York making the best time of the day in this event. In event 4-B, for stock chassis with a piston displacement of 301 to 450 cubic inches and minimum weight of 1,800 pounds, there were five of the eight cars that beat the former record of 1:11.4 made by the Jackson last year.

Starting in his first event, the best Wilcox could do was 1:00.35, but in his fourth start he lowered this to :55.5, which pitted him against the best cars in the field, as it was in the class open to cars of all motive powers, gasoline as well as steam cars. It was in the last event on the day's program the record of the hill that Wilcox made his best time, and he had to do it in order to win out, for Fred W. Belcher of the Knox crew was close at his heels with a climb in :56.3.

Steam in all events eligible was entirely outclassed by both the National and Knox, the best time of the day by a steamer being 1:02.8.

One of the real features of the hill-climb other than that of time was the exhibition for commercial cars and trucks in which the big Gramm and little Cameron competed, with both making an excellent showing, especially the former, which was loaded down with from thirty to fifty officials and spectators.

The climb was a grand success, the attendance being estimated at about 15,000, while the total number of cars parked is figured roughly at 2,700, but despite this fact, it is understood that the officials of the club never again will attempt a hill-climb in this city.

A second exhibition was given by a Gramm 5-ton truck driven by Harry Fischer and loaded with thirty-five passengers in its ascent of 1 mile, which was covered in 6:25. This big truck was put into use by the officials. When the police arrived thirty of them were taken to the top of the hill. Besides the two mentioned trucks, the Knox company sent one of its large trucks all the way up from Springfield carrying twenty-five men.

RESULTS IN HILL-CLIMB AT WORCESTER, MASS.

Name of Car	Driver	Time	Notes
CLASS A, $800 AND UNDER			
Krit	F. W. Pieling	2:10.1	
Cameron	E. White		Withdrew
CLASS A, $801-$1,200			
Oakland	H. S. Bauer	1:50.15	
Cameron	E. White	3:57.55	
CLASS A, $1,201-$1,600			
Oakland	H. S. Bauer	1:37.1	
New Parry	W. C. Wiggin	1:47.85	
CLASS A, $1,601-$2,000			
Velie	R. B. Wiggins	1:21.15	
Buick 38	G. C. Jessup	1:36.5	
Velie	G. R. Wallace, Jr.	1:48.55	
CLASS A, $2,001-$3,000			
National 40	J. M. Rutherford	1:04.3	
Knox four	J. J. Coffey	1:08.16	
National 40	John E. Pugh	1.11	
CLASS B, 60 INCHES AND UNDER			
Flanders 20	G. F. A. Witt	1:18.85	
Empire	George L. Kaeser	1:55.1	
CLASS B, 161 TO 230 INCHES			
Hudson 20	Arthur Johnson	1:48.1	
CLASS B, 231 TO 300 INCHES			
Cole 30	Johnny Jenkins	1:17.55	
Firestone	A. W. Peard	1:24.25	
Cole 30	Henry J. Habich	1:29.6	
CLASS B, 301 TO 450 INCHES			
National 40	H. S. Wilcox	1:00.35	
National 40	J. M. Rutherford	1:03.5	
National 40	F. E. Randall	1:05.45	
Knox	J. J. Coffey	1:05.8	
Buick 38	G. C. Jessup	1:09.25	
National 40	J. E. Pugh	1:12.7	
Velie	Peter Cole	1:14.75	
Buick	G. R. Wallace, Jr.	1:15.7	
CLASS B, 451 TO 600 INCHES			
Knox	J. J. Coffey	1:03.6	
CLASS C, 161 TO 230 INCHES			
Buick 10	D. C. Hooker	1:29.4	
CLASS C, 231 TO 300 INCHES			
Cole 30	Johnny Jenkins	1:16.35	
Cole 30	H. J. Habich	1.20.95	
Cameron six	A. C. White	1:43.2	
CLASS C, 301 TO 450 INCHES			
National 40	H. S. Wilcox	1:01.7	
National 40	F. E. Randall	1:02.8	
National 40	J. M. Rutherford	1:03.35	
Knox four	J. J. Coffey	1:06.85	
Buick 36	G. C. Jessup	1:14.2	
Buick 16	G. R. Wallace, Jr.	1:17.95	
CLASS C, 451 TO 600 INCHES			
National	H. S. Wilcox	:55.7	
Knox six	Fred Belcher	:55.8	
Knox six	J. J. Coffey	1:07.15	
FREE-FOR-ALL, NON STOCK CARS, ANY MOTIVE POWER			
National 50	H. S. Wilcox	:55.5	
Knox six	Fred Belcher	:57.65	
Stanley steamer	W. T. Walsh	1:06.85	
WORCESTER COUNTY AMATEUR CHAMPIONSHIP, NONSTOCK, OWNERS TO DRIVE			
Stanley steamer	Jay Clark, Jr.	1:15.75	
FREE-FOR-ALL. GASOLINE CARS ONLY			
National 50	H. S. Wilcox	:55.7	
Knox six	Fred Belcher	:56.9	
Knox six	J. J. Coffey	1:00.85	
RECORD OF THE HILL. NO LIMITATIONS			
National 50	H. S. Wilcox	:55.45	
Knox six	Fred Belcher	:56.30	
Stanley steamer	Jay Clark, Jr.	1:02.40	
Knox six	J. J. Coffey	1:03.20	
COMMERCIAL CARS AND TRUCKS			
Gramm truck	Harry Fischer	5:25	Loaded
FOR STOCK CARS, MOTOR POWER, STEAM, ELECTRIC, GAS			
Cameron light delivery car	A. C. White	2:00.5	Empty

Hosts Gather for Road Championships

Preparations Complete for Running of National Stock Chassis Races at Elgin Next Week—Entry List As Large As Last Year's With Representative Field in Big Event—Advance Sale of Tickets Large

CHICAGO, Aug. 16—Preparations for the American Automobile Association's national stock chassis road races which will be run at Elgin on Friday and Saturday of next week now are so complete that it looks as if the Chicago Motor Club is about to score another big success. The course is completed, more than $7,000 worth of grandstand seats and parking spaces have been sold, the entry list is a big one that compares most favorably with last year's, and there is every reason to believe the crowds will be twice as large as in 1910. An indication of this is furnished by one farmer who already has received reservations for four times as much parking space as he sold last year.

Racing Men Arrive

Most of the contestants already are here for practice, which begins Friday. The Alco team, consisting of Grant, Lee and Hartman, has been in camp for a week, studying conditions. Mulford came here yesterday and now is out at Elgin. De Palma and Wishart are expected Thursday, while the National team came in today. The National people, upon their arrival here, announced that Zengel and Aitken will drive in the Elgin National, while Merz and Herr will be in the Illinois cup race.

Several new entries have been declared since last week, one of them a Ford with Frank Kulick to drive, which is in the Aurora cup, in which the only other entrant is Mortimer Roberts in an Abbott-Detroit. Three cars are necessary to make a race, and as Ford says he will enter only one, it is likely another Abbott will be put in by A. M. Robbins, the Chicago agent. The Cino and Mercer entries also came in within the past week. The Mercer elected to start two in the Kane County, with Hughes and Barnes as drivers. The club at first put two in the Kane County and one in the Elgin National, but now it is said another car will be put in the big race by Haberer & Co. As the lists stand to date, the entries are:

Entries to Date

Elgin National, for cars under 600 inches—Ralph Mulford, Lozier; John D. Aitken, National; Len Zengel, National; Harry F. Grant, Alco; Frank Lee, Alco; Harry Hartman, Alco; Ralph de Palma, Simplex; Spencer Wishart, Simplex; Dave Buck, Pope-Hartford; Hughie Hughes, Mercer; Andy Burt, Cino.

Illinois cup, for 301-450 class cars—Charles Merz, National; Donald Herr, National; J. H. Stickney, Velie; R. Jeffkins, Velie.

Kane County cup, for 231-300 class cars—Gus Monckmeier, Staver-Chicago; two Staver-Chicagos, drivers not named; A. Maisonville, Corbin; W. H. Pearce, Colby; A. Armstrong, Colby; H. W. Ogren, Colby; Johnny Jenkins, Cole; second Cole, driver not named; Hughie Hughes, Mercer; W. F. Barnes, Jr., Mercer; John Raimey, Cino; Andy Burt, Cino. In addition there are three Falcars entered, but it is not known if they will start, because of the failure of the company.

Aurora cup, for 161-230 class cars—Mortimer Roberts, Abbott-Detroit; Frank Kulick, Ford.

More Bonus Money Received

More contributions to the prize list have been received from the accessory people and now there is $5,350 in outside money to race for. The Remy Electric Co. with $1,200, the Dorian rim people with $500 and the makers of the Cross & Sears speedometer with $200 have offered bonuses recently.

MEET AT BALTIMORE

Baltimore, Md., Aug. 12—At the Electric park meet today Bob Burman in addition to winning the free-for-all for the Remy Brassard in two heats, made the mile in 1:08, equaling his own record for that distance on the ½-mile track, broke the track record for the Electric park track for the ½, 1 and 3 miles. Contesting against Burman for the Remy Brassard and the other feature events were William Knipper in the Mercedes and H. J. Kilpatrick in a Hotchkiss car. Burman's mile in 1:08 broke the track record held by Bill Teubener, which was 1:10⅗. In his exhibition mile Burman made the half mile in :33 seconds. Summary:

Special Race for Klinekars, 1 Mile—Meinker, won; Seecrift, second; Emmert, third. Time, 3:08.

Mile Exhibitions—Burman, Blitzen Benz, 1:08; Knipper, Mercedes, 1:11⅘; Kilpatrick, Hotchkiss, 1:20⅕.

Remy Brassard, Distance 3 Miles—Burman, Benz, won in straight heats; time, 3:50⅕ and 4:13⅕.

One Mile, Under 600 Inches—Meinker, Klinekar, won; Grennon, Stoddard-Dayton, second; Emmert, Klinekar, third. Time, 4:24⅕.

Mile Handicap, Nonstock—Knipper, Mercedes, 5 seconds, won; Grennon, Stoddard-Dayton, 35 seconds, second; Burman, Benz, scratch, third. Time, 3:52⅕.

ROAD RACE FOR CINCINNATI

Cincinnati, O., Aug. 14—Application has been made to the contest board of the A. A. A. for a sanction to hold a road race in Cincinnati on September 9. Recently there was formed in Cincinnati an organization by the name of the Cincinnati Fern Bank Dam Association which is composed of nearly all of the public-spirited citizens of Cincinnati. This organization, as its name implies, was formed to properly celebrate the opening of the Fern Bank dam below Cincinnati, which makes the Ohio river navigable for miles above. The celebration will continue for 6 days, from September 4-9 inclusive.

The course selected by the committee will be about 8 miles in length over some of the most beautiful roads in the country. The work of banking the three turns and putting the course in the pink of condition is being handled by the board of county commissioners. The races will be for stock cars 600 inches and under.

HILL-CLIMB AT AUGUSTA

Augusta, Me., Aug. 11—The first hill-climb ever held in this section took place yesterday. It was held under the auspices of the Augusta Automobile Club and it was run off without a hitch. One of the features was the time made by a Buick driven by Jessup. Summary:

CLASS A, $800 AND UNDER

Car and Driver	Time
Ford, Peterson	:57
Ford, Patten	1:18

CLASS A, $800-$1,200

Oakland, Meader	:59.7
Buick, Marden	1:00
Buick, Ripley	1:05.5
Regal, Hitchborn	No finish

CLASS A, $4,000 AND OVER

Stevens-Duryea, Gannett	:50
Packard, Hill	:51
Packard, Liggett	:54.8
Packard, Strout	:59.8

CLASS A, $1,201-$1,600

Buick, Plummer	:50
Buick, Stebbins	:53.7

CLASS A, $1,601-$2,000

Buick, Page	:49.5
Buick, Marden	:55

CLASS A, $2,001-$3,000

Stevens-Duryea, Marden	:51.5
Stevens-Duryea, Manley	:55

STRIPPED CHASSIS

Buick, Jessup	:34
Buick, Le Cain	:37
Chalmers, Marden	:38
Oakland, Meader	:50

RECORD CLIMB

Buick, Jessup	:34
Buick, Le Cain	:36.2
Chalmers, Marden	:38
Ford, Peterson	:46

MATCH CLIMB

Buick, Le Cain	:34.2
Buick, Jessup	:34.5

WHEEL TAX SUSTAINED

Washington, D. C., Aug. 16—Special telegram—The wheel tax law has been sustained by Judgh Hugh sitting in the district branch of the police court. Exceptions were noted by counsel for LeRoy Mark, who brought the test case, and the case will be taken to the court of appeals. The upholding of this law by the higher courts will mean that Washington motorists will be forced to pay $50,000 a year into the district treasury.

Roads of Middle West Eliminate Many

Only Seven Out of Twenty-Five Left with Clean Records After a Week's Travel in Chicago American Truck Run

KALAMAZOO, Mich., Aug. 15—After 8 days running the Chicago American's commercial vehicle reliability test from Chicago to Detroit and return there are only seven of the twenty-five starters left with perfect scores. The survivors to date are the No. 6 Hewitt, 23 LeMoon, 32 Federal, 16 Kelly, 13 Mais and Nos. 10 and 11 Buick. The three Gramms haven't been figured up as yet on today's run but they have been out of the perfect score class for several days.

The past week has seen some remarkable work on the part of the contesting cars. The second days' run was from South Bend to Ft. Wayne and at the end of that trip there were sixteen still perfect. There were three penalized on the run from Ft. Wayne to Toledo on Thursday, five were penalized going to Lima on Friday while Detroit was the destination on Saturday, a stop being made there over Sunday. The run from Detroit to Jackson on Monday was comparatively easy with only one penalization. Today, however, the run from this city resulted in seven penalizations. So far there has been only one withdrawal, the No. 9 Poss being withdrawn at the end of the third, a cracked cylinder jacket being the main difficulty.

As the score stood tonight it was as follows: No. 9 Poss, out; No. 24 Lincoln, 4 points; 37 Vandyke, 13; 6 Hewitt, perfect; 20 Lauth-Juergens, 7; 30 Owosso, 22; 38 Clark, 68; 39 Ideal, 7; 34 Chase, 4; 1 Gramm, 1,492; 23 LeMoon, perfect; 36 Stephenson, 62; 32 Federal, perfect; 2 Gramm, not figured; 16 Kelly, perfect; 13 Mais, perfect; 3 Gramm, not figured; 14 Dayton, 30; 17 Kelly, 3; 4 Gramm, not figured; 10 Buick, perfect; 11 Buick, perfect; 27 Kritworth, 21; 31 Chicago Pneumatic, 26; 33 Chase, 6; 5 Modern, 26.

Roads in Bad Shape

At 11 o'clock tonight the last of the twenty-five competing commercial vehicles completed the eighth day schedule. After standing in a heavy downpour of rain which fell during the night all cars got away on time at 7 a. m. from Jackson without trouble.

The rain rather improved the roads, but they were so bad for the most part that the referee announced no penalties for lateness. The roads were so bad in places that the heavier vehicles sank into the sand until the axles rested on the ground. Had it not been for the co-operation of the drivers and observers of several of the large trucks and the assistance of some of the officials many of the cars never would have reached Kalamazoo tonight.

At 5 p. m. six of the heaviest vehicles were being held by a crew of road makers who were trying to render a section of the route negotiable, when a communication from the referee, N. H. Van Sicklen, Sr., reached the drivers, giving them permission to throw off as much of the load as necessary, and if desirable to pass on through Battle Creek, the noon control, without stopping the usual hour.

The scheduled route was impassable at the point above mentioned even without loads, so a detour of several miles was made and the six cars checked in at Battle Creek about 7 p. m. instead of during the noon hour, as per schedule.

For the drivers of the large vehicles in particular the grind today was one long round of toil, hardship and privation. As for the cars, they were subjected to strains which they never would have been put to in regular service; and the way in which they have stood the hard service given them today is marvelous.

At Battle Creek only a short stop was made for gasoline and oil, and the journey was resumed. The roads between Battle Creek and Kalamazoo were fairly good except for a number of short stretches which were very bad. Being level, however, and having a solid roadbed, the cars managed to plod through in the darkness with no illumination other than that of the stars and the oil side lamps.

There is little doubt but that an error was made in sending the vehicles over the route traversed today, and the same will apply for tomorrow's run to South Bend. The road conditions call for service for which the vehicles are not designed. There practically is no market in this territory for most of the types of cars competing, and little useful advertising is to be gained by demonstrating to the farmers along the route the necessity for two or three trucks to pull another out of bad stretches in their roads.

Jackson, Mich., Aug. 14—Today's trip was the most strenuous yet encountered in that several sandy and hilly stretches had to be negotiated. The rain which fell on Sunday left the roads in a much improved condition, and most of the lighter vehicles managed to pull through very nicely; but the larger vehicles with their excessively wide treads could not ride in the ruts made by preceding cars, but crushed down the sides of the ruts so that several were stuck hub deep and had to be dug out, towed and pushed. Four and six-tenths miles more than the regular schedule were traversed because of road repairs to the regular route.

Notwithstanding the road conditions, however, with the time allowed for the extra mileage, all but one of the cars reached the night control without penalization for being late; and eight of them still have perfect road scores. The latter include the No. 6 Hewitt, No. 23 Nelson-Le Moon, No. 32 Federal, No. 13 Mais, No. 3 Gramm, No. 17 Kelley, No. 10 Buick, No. 11 Buick.

Among the cars penalized on this day, No. 4 Lincoln lost its perfect score by having to replace a fan belt for which a penalty of 4 points was imposed. No. 37 Van Dyke received 1 point penalty for stalling the motor, and 26 for being late at the night control. The necessary replacement of a magneto control connection cost the No. 20 Lauth-Juergens its first penalty, which was 6 points. For replacing a lost key in the gear-shifting levers, and for subsequent work on the same, No. 30 Owosso received 22 points penalty. No. 36 also dropped from the perfect score class and was penalized 5 points as a result of trouble in getting the motor started after being checked out in the morning. For a motor stop due to want of fuel, and for starting the motor 13 points were imposed on the No. 14 Day-

PENALTIES TO DATE

No. 9, Poss, first day penalized 142 points for repairing cracked cylinder jacket, shifting lever and late at control; second day 136 points, cleaning plugs, stalling motor, tightening bolts, late at control; third day 115 points, late at control, replacing spark plug, repairing throttle control lever.

No. 24 sixth day received 4 points for replacing fan belt.

No. 37, Vandyke, received 11 points first day, stopped motor to let it cool; second day 19 points overheating; sixth day 27 points, stalling motor, late at control; seventh day 13 points, motor stops to cool.

No. 20, Lauth-Juergens, sixth day 6 points for replacing magneto control connection; seventh day 1 point for disconnected magneto wire.

No. 30, Owosso, sixth day, 22 points replacing wire for lost cotter pin in gearshift lever.

No. 38, Clark, third day, 68 points work on magneto and plugs.

No. 39, Ideal, first day, 5 points cleaning spark plugs; fifth day, 2 points readjusting carbureter control rod.

No. 34, Chase, first day, 4 points stopping motor to cool it.

No. 1, Gramm, second day, 1,492 points for work on carbureter and magneto, and being late at control.

No. 36, Stephenson, sixth day, 5 points for trouble in starting motor after checking out; seventh day, 57 points for adjusting clutch, replacing chain and key in sprocket of jackshaft.

No. 2, Gramm, third day, 4 points for replacing nuts on spring clip.

No. 16, Kelly, 4 points first day for cleaning spark plugs.

No. 14, Dayton, first day, 1 point stalling motor; second day, 4 points replacing fan belt; fourth day, 2 points repairing leaky gasoline connection on carbureter; sixth day, 13 points stalling motor and motor stop on account of running out of fuel; seventh day, 10 points putting on new gasoline feed line.

No. 17, Kelly, seventh day, 3 points, work on clutch.

No. 4, Gramm, first day, 4 points cleaning and adjusting spark plugs.

No. 27, Kritworth, 21 points, first day, repairing magneto and cleaning spark plugs.

No. 31, C. P. T., third day, 4 points changing spark plug; fourth day, 10 points adjusting vibrator on ignition coil; fifth day, 1 point replacing spark plug; sixth day, 6 points, replacing spark plug, driving chain and adjusting transmission; seventh day, 5 points, replacing spark plugs and chain.

No. 33, Chase, second day, 4 points for cleaning and replacing plugs; seventh day, 2 points changing spark plugs.

No. 5, Modern, second day, 26 points repairing broken fan belt.

Perfect Scores in Big Motor Truck Run

Particularly Hard Going is Encountered from Jackson to Kalamazoo, Caused by Rain and Heavy Roads On Route

ton, and 6 points came to the No. 31 Chicago Pneumatic for replacing a plug.

Sunday in Detroit

Detroit, Mich., Aug. 13—The fifth day of the contest for commercial vehicles ended in Detroit Saturday. The Poss motor wagon on account of engine trouble had to drop out between Lima and Detroit. There still remain twelve who up to Saturday have maintained a perfect road score, their work showing clearly what motor trucks can do on the road. They are as follows: Lincoln, Hewitt, Lauth-Juergens, Le Moon, Stephenson, Federal, Kelly, Mais, Gramm, two Buicks and the Owosso.

Road conditions Saturday were heavy and sandy for about 35 miles, giving all trucks a taste of heavy hauling, but notwithstanding this all reached Detroit ahead of schedule time. Monday the route will be from Detroit to Jackson, with noon control at Ann Arbor. This stretch will give all a taste of heavy going for some sand will be encountered.

So far the trip has been devoid of any accidents of any kind and has been an entire success.

Yesterday the contestants encountered one place where a new bridge was in course of construction, making it necessary to go around, down a steep incline, through a deep ditch and up another steep grade onto the road on the other side. It was expected some of the larger trucks to have trouble, but none had any.

Penalties for Saturday and causes are as follows: Ideal, 4 points for readjusting carbureter control rod, and Chicago Pneumatic Tool 2 points for replacing spark plug.

Lima to Toledo

Toledo, O., Aug. 11—The run today from Lima to Toledo was a very easy one, the roads, for the most part, being like boulevards. Three cars suffered penalties. The No. 9 Poss encountered serious engine trouble shortly after leaving Lima and quit the contest. It will be repaired in Detroit, however, and continue as a non-contestant. The Dayton suffered an additional 4 points penalty for repairing a leaky gasoline connection in the carbureter. The car entered by the Chicago Pneumatic Tool Co. was penalized 20 points for adjusting the vibrators of the ignition coil.

All cars but the Poss were checked in at Toledo before 6 p. m. and the first car to start in the morning is to leave at 6 a. m.

Fort Wayne to Lima

Lima, O., Aug. 10—Only five of the twenty-six commercial vehicles that left Fort Wayne this morning were penalized during the journey to Lima. These included the Poss, which received 140 points for replacing spark plugs, repairing throttle control, and for being late at the controls; the Clark which was penalized 136 points for work on the magneto and spark plugs; the No. 2 Gramm, 4 points for changing plug; and the Chase No. 34, whose driver examined the circuit-breaker box of his magneto. The observer on the car of the latter neglected to make a note of this work or the time required to do it, and the matter is now being investigated by the technical committee so that the proper penalty can be imposed.

The No. 1 Gramm truck which was stopped on the road for 9 hours 46 minutes yesterday evening for supposed carbureter trouble, was started again about 3:45 in the morning by another of the Gramm crew who simply tightened a magneto connection and eliminated the trouble for which the regular driver and mechanic had searched in vain for several hours, the truck arriving at Ft. Wayne at about 5:30 a. m. The carbureter was suspected at first, and consequently removed and tinkered with for a considerable length of time, while a new carbureter was ordered from the Gramm factory at Lima, O. On arrival of the new carbureter at about 1 o'clock a. m. a touring car with Gramm representatives and repairmen left Fort Wayne for the injured car which lay by the roadside 20 miles back. When the relief car arrived on the scene, the driver, mechanic and observer were asleep, and being awakened work was resumed. The attempt to replace the old carbureter with the new one revealed the fact that it would not fit; so the old one was examined by another one of the Gramm drivers, found to be in apparently good condition, replaced, an examination of the magneto made; a loose terminal was found and tightened, and the motor then started and run into town without further trouble, making a perfect score in today's run.

On arriving at Lima, the home of the Gramm trucks, an excellent parking space had been arranged in the public square, the citizens having been previously advised that this section would be closed for traffic. A large crowd of people were on hand to welcome the contestants, and the Gramm trucks which arranged to trail in together, were accompanied by a number of cars.

In the evening a banquet was given by the Gramm people to the officials and the Lima and Elks clubs were thrown open to all contestants. Refreshments were served at both clubs.

South Bend to Fort Wayne

Fort Wayne, Ind., Aug. 9—At the end of the second day's run sixteen cars still retained their perfect scores. Of the six cars that were penalized today the No. 33 Chase received 6 points for cleaning and replacing spark plugs; the Poss, which is making its maiden trip, it being the first car built by its makers, suffered most heavily, 142 points being imposed for changing spark plugs, stalling the motor and for being late at controls. The Van Dyke received 19 points for stopping the motor to allow it to cool; loss of water through defective gasket being the cause of the overheating. The No. 1 Gramm lies disabled about 20 miles from Fort Wayne, awaiting the arrival of a new carbureter. The delay undoubtedly will bring upon this car an extremely heavy penalty, as it is several hours late.

The No. 14 Dayton, known as the Mary Ann, received 4 points for replacing a fan belt; and the No. 5 Modern got a penalty of 34 points for a similar operation.

STANDING FOR 7 DAYS IN CHICAGO-DETROIT TRUCK RUN

No.	Car	First day	Second day	Third day	Fourth day	Fifth day	Sixth day	Seventh day	Total points
						Withdrawn			
9	Poss	142	136	115	0	0	4	0	4
24	Lincoln	0	0	0	0	0	27	13	70
37	Van Dyke	11	19	0	0	0	0	0	Perfect
6	Hewitt	0	0	0	0	0	6	1	7
20	Lauth-Juergens	0	0	0	0	0	22	0	22
30	Owosso	0	0	0	0	0	0	0	68
38	Clark	0	0	68	0	0	0	0	7
39	Ideal	5	0	0	0	2	0	0	4
34	Chase	4	0	0	0	0	0	0	1492
1	Gramm	0	1492	0	0	0	0	0	Perfect
23	LeMoon	0	0	0	0	0	5	57	62
36	Stevenson	0	0	0	0	0	0	0	Perfect
32	Federal	0	0	0	0	0	0		
2	Gramm	0	0	4	0	0	0	0	4
16	Kelly	4	0	0	0	0	0	0	Perfect
13	Mais	0	0	0	0	0	0		
3	Gramm	0	0	0	0	0	0		
14	Dayton	1	4	0	2	0	13	0	20
17	Kelly	0	0	0	0	0	0	0	Perfect
4	Gramm	4	0	0	0	0	0		
10	Buick	0	0	0	0	0	0	0	Perfect
11	Buick	0	0	0	0	0	0	0	Perfect
27	Kritworth	21	0	0	0	0	0	0	21
31	C. P. T.	0	0	4	10	1	6	5	26
33	Chase	0	4	0	0	0	0	2	6
5	Modern	0	26	0	0	0	0	0	26

Car Makers Discuss Contest Rules

Session in Detroit Talks Over Glidden Tour and Insists Contestants Must Be Registered as Stock—Dirt Track Racing To Be Regulated by Insisting on Promoters Living up to Demands of A. A. A.—N. A. A. M. To Be Asked for Funds

DETROIT, MICH., Aug. 11—The 2-day session of the Manufacturers' Contest Association, called for the purpose of discussing contest rules for 1912 and also on many points having bearing on contests, came to a close here this evening. Not more than twelve different companies were represented at the different sessions but the discussions were long and much enthusiasm was displayed, and as a result many of the kinks in the contest rules for pleasure and commercial cars for the present season have been removed. The work was varied, including such topics as the Glidden tour, ½-mile track races, mile track races, chassis weight limits on stock cars, stock-car events for 1912, rules for commercial vehicle tests, drivers' organizations, etc.

Glidden Tour Discussed

The first topic to be taken up was that of the proposed Glidden tour for October, which is scheduled to run from New York to Jacksonville, Fla., by way of Atlanta, Ga. This tour is scheduled to be a good roads booster scheme and as such Chairman S. M. Butler, of the contest board of the American Automobile Association, asked that the entering of cars by private owners be simplified by not requiring those cars to be registered. At present it is necessary that stock cars be registered with the A. A. A. contest board before they can compete in any reliability run. There are a few manufacturers who have refused to register their cars this year. They have refused to register them in order to keep their dealers and owners from entering contests. Chairman Butler explained that there are many owners of those unregistered cars who wish to enter this southern Glidden, and it was for the benefit of these that the demand to eliminate the stock registration clause was introduced. After considerable discussion it was decided to make no change in the rules so that only registered stock cars will be allowed to compete. Representatives of some makers present frankly admitted that tney did not want owners to enter contests and had refrained from having their cars registered in order to prohibit owners entering such.

It did not take the committee long to vote that no sanctions for speed trials on ½-mile tracks be granted. George H. Robertson, president of the Motor Racing Drivers' Association, stated that his organization, composed of professional drivers, was opposed to sanctions on ½-mile tracks.

Following the discussion on ½-mile tracks came that of mile tracks. This discussion was prompted by several fatal accidents that have occurred at track meets on mile tracks this summer. It was conceded by all present that the great trouble with track meets has been the irresponsibility of the promoter, who has not taken sufficient precautions to safeguard the interest of all concerned. In many meets this summer tracks have not been sufficiently oiled; in others, official cars have been admitted on the track during contests, and some of the contesting cars have gone through the fence in order to avoid colliding with these official machines. In other cases dangerous fences have been allowed to stand and the conduct of the meet has been very lax. By vote it was finally decided that sanctions would continue to be granted on mile tracks but that the promoter would be compelled to live up to the letter of the law, in so far as the rules are concerned. This makes it obligatory to satisfactorily oil or use other means of laying the dust under the supervision of a paid expert whose duty it will be to see that the track is properly prepared for the meet and that dust-preventing mechanism are used. It is further voted that each promter should be required to put up a cash bond of not under $500 accompanying his application for sanction, said bond to be a guarantee that the promoter will meet the requirements, in so far as track preparation is concerned.

What the Drivers Want

In speaking for the continuance of racing on mile tracks, George H. Robertson asked for the division of drivers in two classes—professional and novice. Professional drivers are those who have had at least 1 year's experience in track driving. A novice driver never should be allowed to compete against a professional. The object of this provision is to eliminate accidents, Mr. Robertson declaring that accidents are more frequently due to poor driving than to the condition of the track. A novice driver could be promoted from the novice to the professional class by vote of the executive committee of the Motor Racing Drivers' Association. Among other recommendations of Mr. Robertson were:

1—Removal of the top rail of the inside and outside fences.

2—Better guarding of the paddock approaches to prevent collisions between cars on the track and those coming out of the paddock.

3—First, second and third cash prizes, the third not to be less than $5 in a track meet or less than $100 in a road meet.

4—Oiling of course at least 3 or 4 days in advance of the date of the meet.

5—A mechanic to be carried in all races.

To Ask N. A. A. M. for Funds

President Howard Coffin of the Manufacturers' Contest Association agreed that track racing should be reformed but that it would require considerable financing to carrying this out, his idea being that the present rules are satisfactory but that it is impossible to enforce them. He argued and had a resolution put through that the National Association of Automobile Manufacturers be asked to finance the affairs of the contest board of the A. A. A. The N. A. A. M. is the governing body, to which practically all manufacturers belong, and as such should be responsible for the contest situation, it is argued. It was decided to ask this association to take this matter up at its meeting in New York September 6. Mr. Coffin apprehended that approximately $2,000,000 is expended annually by the different manufacturers in contests, and he deplored the fact that an adequate system of controlling the sport-governing body for this expenditure is not at hand. He compared the present inadequate system with a $2,000,000 business corporation having an office force of half a dozen people.

The matter of commercial vehicle contests was taken up at length, the discussion being opened by E. W. Curtis, representative of the Electric Vehicle Association. In a matter of contests Mr. Curtis suggested that electric vehicles be given greater recognition suggested two kinds of commercial vehicles contests, one to be known as city contests and intended for gasoline and electric vehicles and the other inter-city contests intended solely for gasoline vehicles. The inter-city field is not adapted for the electric vehicle work. Mr. Curtis recommended that the loads carried in contests be approximately seven-eighths of the rated load of the vehicle; that economy and cost of operation be taken into consideration as well as reliability; that three-wheeled vehicles be allowed to compete—the present law recognizes only four-wheeled commercial vehicles; that 50-feet stopping distance in the brake test is too long; that all rules call for two sets of brakes; and that commercial contests conducted by individual promoters should be discouraged.

A. W. Markham, of the Mais Truck Co., argued that there should be one schedule

for commercial contests in large cities and an entirely different schedule for contests in the country. At the end of the discussion it was regularly moved and seconded that sanctions for commercial contests be not granted to individuals or individual corporations and that motor clubs and truck associations be encouraged in the promotion of satisfactory commercial vehicle tests.

Stand by Stock-Car Rules

It was the general consensus of opinion that no change should be made in the present stock-car rules. It was a matter of general regret that stock-car competition has not been entered into with greater vim by the manufacturers this year. The Elgin races will be practically the only large stock-car event of the season. It was resolved that for the 1912 season the contest committee be asked to sanction twelve stock-car events in which its technical committee will attend. These events are to be scattered through the greatest market sections of the country.

It was the unanimous opinion of the many delegates that additional precautions be taken in the matter of roadway, beach and track races. It was accordingly recognized that in all speed contests a mechanic must ride with the driver. This also applies to practice for road races or track meets.

One point of importance was the elimination of weight limit in stock chassis events which was to take place immediately. Up to the present stock cars have been required to weigh over a certain amount in each division. In some divisions this figure has been too high, with the result that a few makes of cars which are stock and have been registered in the regular way have been prevented from entering stock contests because they were too light. The removal of the weight restriction will give these cars the privilege of entering which is enjoyed by other manufacturers.

Those Present

Among those representatives attending the meeting were Howard Coffin, Hudson Motor Car Co.; Howard Marmon, Nordyke & Marmon Co.; S. M. Butler, chairman contest board A. A. A.; F. E. Edwards, chairman technical committee A. A. A.; C. A. Emise, Lozier Motor Car Co.; M. C. Meigs, J. I. Case Threshing Machine Co.; N. A. Hawkins, Ford Motor Car Co.; J. H. Newmark, Oakland Motor Car Co.; Mortimer Reeves, United States Motors Co.; A. W. Markham, Mais Motor Truck Co.; E. W. Curtis, Electric Vehicle Association of America; Elmer Pratt, Pierce-Arrow Motor Car Co.; George H. Robertson, president Motor Racing Drivers' Association, and Russel Field, secretary Manufacturers' Contest Association.

PROGRESS OF FRENCH TRUCK TEST

Paris, Aug. 4.—Since the 2 opening days the commercial vehicle competition organized by the French army authorities has continued with a regularity amounting almost to monotonousness. The first day saw the disappearance of the two Purrey steamers, which left the central garage with their two trailers and their 8-ton load and never returned or gave any explanation of their withdrawal. On the following day the two new models of the front-drive Latil, having been too hurriedly prepared for the competition, had to be withdrawn owing to mechanical defects. All the others have now been running for 8 days without a falter, returning to the garage every night on schedule time with but a few insignificant stops on the roadside. For the first 4 days the run was made on gasoline with a full load, on the fifth day they were all sent out empty, and after a rest on the sixth day another stage had to be covered without load, and two without load and in convoy formation. Next week all the trucks will be obliged to run on carburated alcohol, carrying full load, and for the last 9 days benzol will be the fuel, under full load singly and in convoy formation.

Being a purely military event, and the public not encouraged to attend, the trials have passed off without exciting any interest among users or probable users of commercial vehicles. Except on the open road there is no opportunity of examining the trucks, for as they finish their run they enter for 1 hour into an outer open-air garage to which only officers and a few priviliged ticket holders are admitted and at the end of that time pass into a military-guarded inner garage closed to all without exception.

OUTLOOK IN OKLAHOMA

Oklahoma City, Okla., Aug. 14—With $200,000,000 to spend this fall, the farmers of the state of Oklahoma have gone motor mad. The cotton crop of Oklahoma promises to produce more cash than in any 1 year of the state's history. The magnificent rains of the midsummer have started enormous crops of alfalfa, milo, cane and turnips. These forage crops are already fattening the cattle and hogs of the state and as Oklahoma City has two packing plants, each with a capacity of 12,000 head daily, the impetus given the livestock industry of the state is unprecedented.

While other states have lost their early crops, and while Oklahoma experienced some disaster along the same line, the marvelous fertility of Oklahoma soil added to the temperate climate has made possible the planting of a second crop.

Cotton was planted early, is now coming to market in a small way and in 2 weeks the cotton shipping towns of Oklahoma will be crowded with wagonloads of cotton, and before October 1 the railroads of Oklahoma will be swamped with cotton shipments.

With the cotton crop assured and other crops in fine condition, the tillers of the Oklahoma soil are in the mood to buy cars, not merely for fun or for touring but for business.

One of the leading farmers of this county told the writer that he had purchased a car for farm use simply for the reason that he could haul a load to market and return to his home before midday meal, while in days gone by it was necessary to start to town with his produce at daylight, making the return trip in the afternoon, horses or mules being unable to make the trip inside of 14 hours under favorable conditions.

The gain of half a day each 24 hours spells riches for the farmers of this state and they are not slow to realize that a motor car can be made a money-maker, and at the same time provide a speedy means for going visiting on Sundays. Hence Oklahoma farmers will purchase more cars this fall than during any season since motoring became a part of the life of a farmer.

At the recent county fair held at Watonga in Blaine county, the grounds were crowded with the cars of the farmers of Blaine county as well as the cars from the adjoining counties of Canadian, Major and Kingfisher. Farmers who formerly could not attend this fair on account of the impossibility of making the trip so that they could return to their homes at night now are able to travel over the good country roads, attend the fair, sleep at home at night, and return to the fair each day.

In the horse days farmers came to that famous fair from a distance of 12 miles, but no more. At the one held 2 weeks ago, hundreds of farmers motored 40 or 50 miles to attend the displays that were made. At the close of the day's program they rushed for home and reached their own farms before darkness had settled over the Oklahoma prairies.

The motor dealers of Oklahoma are making their plans for the increased business which they know will start about the middle of September. By that date more than $50,000,0000 of cotton will have been converted into cash. The cotton will follow the fall days and reach the local shipping points at the rate of $5,000,000 each week until holiday time, and the farmers of Oklahoma are going to buy motor cars with the money.

One farmer stated that it had been his policy for years to purchase a new team of horses each year with the revenue from his fall products, but that this year he should buy a motor car, as it would take the place of the team which he might buy this fall and also the two other teams which he owned and which he could now sell. He looked at the matter of the motor car with purely economic reasons.

What this farmer will do is what other farmers will do. The motor car is considered by the Oklahoma farmers as a necessary implement just as a reaper, a binder or a mower. The motor car is a money-maker and a money-saver, and the Oklahoma farmers have the money in sight to buy many cars.

Hupp Sells His Stock in Car Company

Organizer of Concern Making Hupmobiles Disposss of his Interests and Will Get Out September 1—Packard Has Contracts for $14,000,000 Worth of Cars—Bright Outlook for 1912

DETROIT, Mich., Aug. 15—Robert C. Hupp, president of the Hupp Motor Co., of which he was also organizer, yesterday disposed of his stock to a number of the present officers of this company and will on September 1 cease all connection with the firm. Until that time he retains his offices of president and general manager, though practically all of his time will be devoted to the affairs of the Hupp Corporation, a collection of manufacturing plants in Fairview, east of Detroit.

Mr. Hupp's retirement from the affairs of the motor car company has been rumored for some time but has been categorically denied by both himself and by the officers of the company. At the request of a syndicate of large stockholders, however, he placed a price on his holdings last Saturday. The proposition was debated for several days and then accepted. Up to the last moment Mr. Hupp did not believe that his figure would be met.

Local gossip is now busy with the future plans of the Hupp Corporation. It is freely rumored that it will soon add to its products a gasoline car of light type on lines somewhat similar to those of the Hupmobile. Mr. Hupp refuses to discuss this matter aside from authorizing the statement that the Hupp Corporation is now fully equipped to build any sort of motor car product.

Prior to organization of the Hupp Motor Car Co., which has been a marked financial success, Mr. Hupp was connected with the Oldsmobile company, both at Detroit and Lansing. The deal for the purchase of Mr. Hupp's stock took place a few days after the return of ex-Congressman Irwin Denby, one of the heavy stockholders in the concern, and it is believed that Mr. Denby was a large purchaser of the stock. It is also predicted that he will succeed Mr. Hupp as president.

Study Other Cars

That sales departments of the various motor car factories are rapidly systematizing their work on lines adopted by other manufacturers of staple articles has been in evidence in many ways during the past few months and nearly every meeting of dealers has brought out some new feature. In former years such meetings have concerned themselves with exclusive references to the cars manufactured by the plant whose dealers were present. The present tendency is now very strongly toward demonstrations of the company's own cars side by side with those of competing concerns. Detroit companies now own cars of almost every rival make and use them in the demonstration of the superiority of their own product. The strong points of one car are contrasted with the weaknesses of the rival products, the object being obviously to send the dealers away with a new supply of selling argument.

Organization of confidential relations between the manufacturing and retailing ends of the business has been, in the judgment of many, the most remarkable feature of the industry's 1911 development.

An event of general interest throughout the trade is the departure of President Neal of the General Motors Co. to Europe on a prolonged trip. It is understood locally that Mr. Neal's visit is materially of a business nature, the nature of which is, however, not disclosed. He said in an interview before leaving that the financial affairs of the company are now on a thoroughly satisfactory basis, and that the company, as its indebtedness is now arranged, does not now owe a dollar to any bank and has the money on hand to pay outstanding obligations as rapidly as they become due.

Bright Outlook for 1912

Closing of contracts now is generally regarded as about finished at the various factories. All agree that the season of 1912 promises very well. The Packard Motor Car Co. is out with the statement that there are now contracts on its books for $14,000,000 worth of cars. It is employing 7,000 men in its mammoth plant, which is now running at full capacity. In addition to the contracts mentioned, the company expects to produce motor trucks to the value of $3,500,000. The company is now engaged in large building operations and has recently closed deals for 129 pieces of land about the factory, the real estate transactions footing up to the neighborhood of $300,000.

BUICK PLANS FOR 1912

Flint, Mich., Aug. 14—Following in line with the other large manufacturers of motor cars which have announced increased rates of production for the season of 1912 is the Buick Motor Co. of this city, which states that it has matured plans for the construction of 20,000 cars for 1911. This is a considerable increase over the season now coming to a close, the figures for 1911 being announced at 15,811. While the 1912 rate of production will be nothing like that of the boom days of 1909 and 1910, it is recalled to mind by the factory announcement that plans for 1911 were radically curtailed and a very late start in production was made.

At present the Buick plant is employing 2,500 men, most of whom are now engaged on the completion of the 1911 run. The entire body plant is now, however, engaged on the plans for 1912, and a sufficient supply of bodies was secured early in the week for the shipment of a full line of samples to Canada and another to England. Within a couple of weeks the demonstrating cars will, it is predicted, be going out to the Buick dealers in the United States.

The resumption of production at the Buick plants has been welcomed in all sorts of business at Flint. Workmen who have been elsewhere during the summer are returning to their homes here and all are finding work. The force is being steadily increased.

It is stated at the factory that the cut in production of 1911 was found considerably too radical. One of the department heads of the company states that there was not a single Buick dealer in the United States who did not beg for more cars than the factory found itself able to supply.

Most of the production for 1912 will be on two chassis types, to be known as Nos. 34 and 35 and Nos. 28 and 29. These will be fitted with roadster and touring car bodies respectively, as well as delivery wagon varieties. Plans for a touring car with detachable tonneau, to be known as No. 43, have also been accepted.

FAL IN RECEIVER'S HANDS

Chicago, Aug. 12—The Fal Motor Co., of Chicago, maker of the Falcar, went into the receiver's hands today when Referee in Bankruptcy Wean named Edward C. Day, a lawyer, as receiver. The application was made by a creditors' committee consisting of H. K. Gilbert, of the Buda Co.; A. H. D. Altree, of the Bosch Magneto Co., and H. H. Seaman, of the W. S. Seaman Co. The value of the assets is placed at $75,000 and the liabilities at $150,000.

Just what the receiver will do has not been determined. An inventory is being taken now and when that is completed a policy will be outlined. However, it has been determined to finish up the cars now on hand. The creditors' committee has made the following statement relative to the receivership appointment:

"On April 17, 1911, the creditors' committee wrote to the creditors advising them of a proposed arrangement to carry on the affairs of the Fal Motor Co. under an extension of 1, 2 and 3 years, and of an opportunity of securing the loan of a working capital to assist the company. A majority of the creditors accepted this proposition and on May 12 notes were mailed to the various creditors. The creditors' committee has been trying since then to ascertain the true position of the company with reference to the assets, liabilities and prospects. Owing to the methods in which the books and records of the company were kept prior to the creditors' committee making this investigation, it

was impossible to accurately determine the total amount of the indebtedness. But as the investigation has continued a considerable increase in the indebtedness has been found, and an inventory which has just been completed shows an approximate value of assets from $40,000 to $50,000, regarding the company as a going concern, but it would be largely decreased at a forced sale.

"Owing to the increase in liabilities, the decrease in actual value of assets as shown in the inventory, and the inability of the company to market a sufficient quantity of its product to carry on its affairs without a much larger sum of money than could be secured, and the disposition of some creditors and others holding claims, to force the immediate payment of the same, it has been felt best by the committee that the company should be put into bankruptcy and a receiver appointed in order to preserve for the creditors so far as possible such assets as the company may have."

TALK OVER NEXT YEAR

New York, Aug. 16—Special telegram—In order to talk over the selling plans for the next 12 months the United States Motor Co. has just held a series of big conventions with its dealers all over the country. The first of these 2-day conventions was held in Atlantic City some weeks ago. This was followed by a meeting in Detroit, which was in turn followed by one in Chicago and another in Kansas City, Mo. The company was represented at all of these by Benjamin Briscoe, Horace de Lisser, Alfred Reeves, Fred Dayton, D. C. Fenner and J. A. Dell.

ROAD MEETING ON COAST

Portland, Ore., Aug. 12—Radical changes in organization were accomplished by the Pacific Highway Association's annual convention at Portland on August 5. Instead of working through individuals as heretofore, the association will work through organizations enlisted in its membership and definitely pledged to promote the Pacific higway.

It was arranged that six vice-presidents be elected in addition to the president and secretary-treasurer, two from British Columbia, one each from Washington and Oregon and two from California. The organization was made permanent and the plan for the north and south tourist and scenic highway along the Pacific coast, from Canada to Mexico, will be prosecuted more vigorously than ever.

Consideration of the new constitution and by-laws occupied the most of the time at the convention. Addresses were delivered by A. Warren Gould, president of the Seattle Automobile Club; Frank N. McCandless, president of Pierce County Good Roads Association; W. J. Roberts, Washington Highway Commissioner; C. C. Chapman, manager of Portland Commercial Club's promotion department, and E. Henry Wemme, father of good roads in Oregon.

The following were elected: Judge J. T. Ronald, president; F. M. Fretwell, secretary; and the following vice-presidents: F. M. McCandless, of Tacoma; F. B. Riley, of Portland; A. E. Todd, of Victoria; C. A. Ross, of Vancouver, B. C., and J. S. Mitchell, of Los Angeles. The selection of a vice-president for northern California was postponed until communications could be held with the good roads associations of that locality.

Intense enthusiasm prevailed throughout the session and all the speakers agreed in predicting that the opening of the highway from the Mexican line to Alaska was now only a matter of a short time.

A telegram was received from Shasta Springs, Cal., inviting the association to hold its next meeting there. Resolutions were adopted thanking the press for the interest and assistance it had rendered in the campaign, and the Portland Commercial Club and Automobile Club for the hospitality tey ad extended.

Briscoe Makes Prediction on Output

President of United States Motor Co. Estimates that 210,000 Cars Will Be Manufactured in 1912 by American Firms —Will Be Biggest Year Industry Ever Had, He Thinks

NEW YORK, Aug. 16—Special telegram—The prediction was made here today by Benjamin Briscoe, president of the United States Motor Co., that 210,000 motor cars will be built by American makers for the 1912 season. Of this number 60 per cent will be for utility purposes, for the motor car has become such an important addition to modern civilization, the American who does much traveling must have his car or fall behind in the fast moving world of business. In speaking of the motor car, Mr. Briscoe said:

"The biggest year of the industry up to this time has been 183,000 cars at an average retail price of $1,533, but 1912 will see not fewer than 120,000 pleasure cars at an average price of about $1,100 or less, with a substantial increase in the higher priced cars. Of this number 60 per cent will be used by physicians, contractors, salesmen and for other utility purposes. This number is in addition to motor trucks and cars used exclusively for freight hauling. Of this enormous car production the major portion will be manufactured by a comparatively small number of big producers.

"The motor car industry is now down to a basis of stability that averages up with any other business dealing in staple articles. The buyer wants reliability in service just as we expect it in a locomotive power and style as well as proper prices are influential factors because the public's knowledge of the car is increasing and the buyer has well defined ideas as to what is best for his particular needs in the motoring line.

"The farmer is becoming every year a greater factor in the industry. The cotton crop in the south will be one of the greatest in its history and this will help sales. Crops in the Dakotas are bad because of dry weather and similar conditions to a lesser degree exist in Kansas, Nebraska, Oklahoma and a part of Texas. The farmers are now buying cars and will continue to buy them in greater numbers."

TO BUILD ENGINES AT FLINT

Flint, Mich., Aug. 14—A new industrial plant has been assured Flint in the formal announcement made recently of the organization of the Mason Motor Co., which has just filed articles of incorporation with the secretary of state at Lansing. The capital stock is $100,000. All of the capital stock has been paid in. The new concern will engage in the manufacture of engines for motor cars.

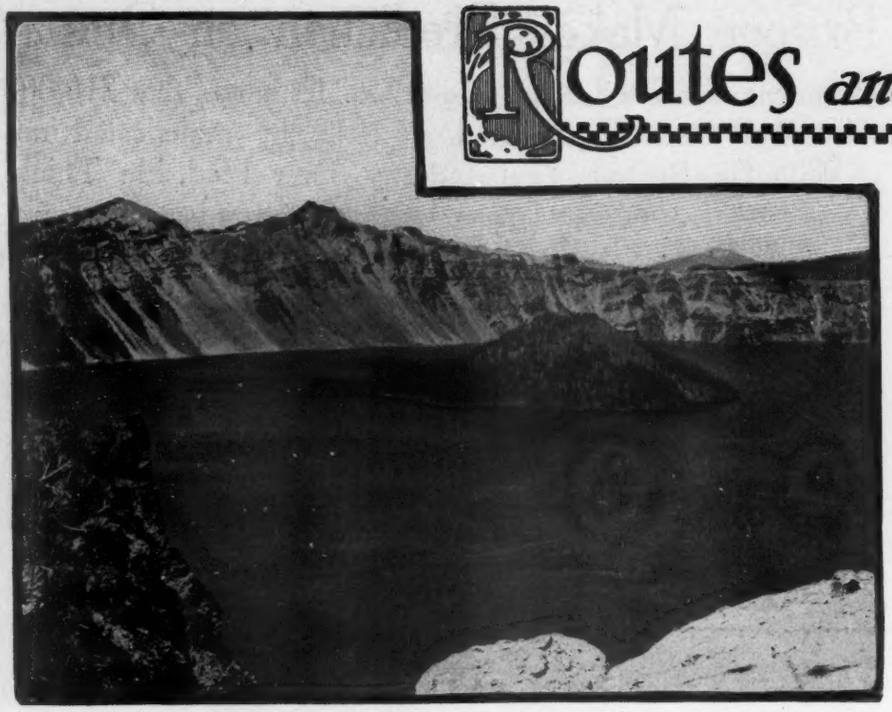
The company has closed a 2-years' lease of a large four-story building in the Fourth ward, adjoining the Flint Wagon Works. The building is 85 by 65 feet and has a floor space of about 5,500 square feet. The capacity of the plant will be forty engines per day.

The Mason company will make engines for the new Chevrolet cars, which are to be built in Detroit until a permanent site for the Chevrolet Motor Co.'s plant is selected. The new concern has a contract to supply the Chevrolet company with 2,500 engines during the 1912 season.

POPULAR ROUTE CLOSED

New York, Aug. 16—Special telegram—The main road between Albany, N. Y., and Pittsfield, Mass., one of the best touring routes in that section, will be closed for several weeks due to the amount of repairing being done on it. The Touring Club of America has erected signs across the road with information as to the best detours. Within the next 2 weeks the highway officials of New York, Connecticut and Massachusetts will make an inspection tour over the roads of their respective states with the object of discussing available methods for highway construction through these states as well as arranging a personal conference among the different commissioners. The meeting place is Albany and the route will be to Pittsfield and Springfield, where a conference will be held and the matter of road improvement thoroughly discussed.

Routes and Touring

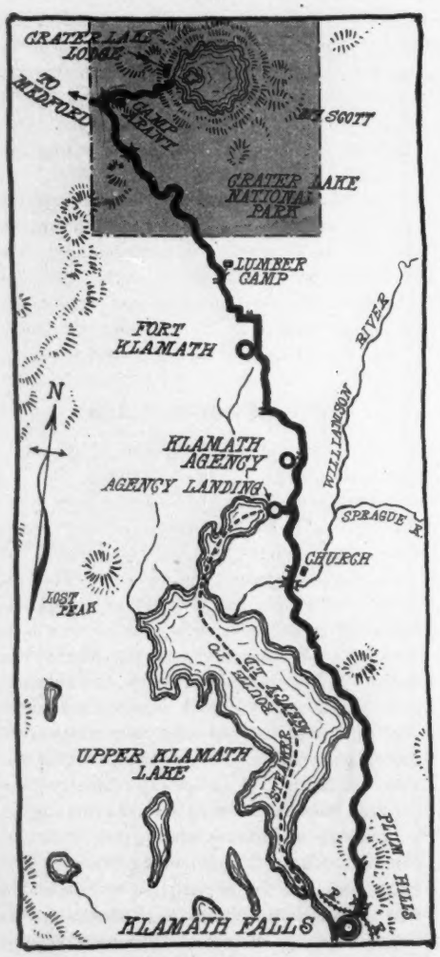


WINTER TIME AT CRATER LAKE, NATIONAL PARK, OREGON

THROUGH SOUTH DAKOTA

POLO, Ill.—Editor Motor Age—Kindly publish the best route from Spirit Lake, Iowa, through Sioux Falls and Mitchell to Rapid City, S. D.—J. B. Miller & Sons.

The route lies a trifle south to Milford, Fostoria and Spencer, then west to Hartley, Sanborn, Evander, Sheldon, Boyden, Hull, Perkins, Lakewood, Rock Rapids, Lester, Larchwood, Benclare, Sioux Falls, Hartford, Humboldt, Montrose, Salem, Spencer, Farmer, Riverside, Mitchell, Woonsocket, Wolsey, Wessington and Vayland. Cross the railroad and continue to St. Lawrence, cross railroad and enter Miller, then Highmore, then 15 miles to Harrold on the north side of the railroad and follow the telephone line to Blunt. For the particulars on the road from Blunt to Pierre you might inquire at the Gas Belt Land Co. At Pierre you cross on the ferry train to Fort Pierre, then travel on to Meers, Hayes, Gray's, Ottumwa, Oldtrail and Phillip. Upon reaching Phillip keep to the north of the Bad river on top of the bluffs and to north of the railroad following on to Cottonwood and Quinn and thence cross the railroad at Wall, where a bad hill will have to be climbed. The next town is Wasta, and you will either be obliged to ford the Cheyenne river or cross a railroad bridge about 2 miles east. Now follow the telephone line west to Underwood, Box Elder and Rapid City.



KLAMATH FALLS TO CRATER LAKE

SETTLING DAMAGE CASE

Houston, Tex.—Editor Motor Age—Here is a pointer for the motorist settling a claim in the rural district. Everybody knows the prejudice on the part of our farmer friends against the motor car owner and the inability to get a fair trial before the ordinary justice of peace or before a country jury. This condition frequently induces the tourist to follow the old adage, "Discretion is the better part of valor," and when a man finds himself 25 or 50 miles from his home town, it is of course advisable to secure some compromise right on the ground at the time of the accident, rather than to have to go to the trouble and expense of defending the suit, which he knows in advance is almost sure to go against him, and which would require one or more visits to the scene of the trouble and expenditure in court costs and attorney's fees. A little diplomacy and the exercise of the spirit of fair dealing will enable a man to settle a claim within 30 minutes, and in nine cases out of ten it is economy to settle a controversy of this sort, although the motorist knows at the time that he is not legally liable. It is highly important that a proper receipt be secured from the claimant, and the receipt herewith may furnish food for thought to the tourist, as it effectively prohibits the party injured from accepting your money and afterwards filing suit:

Received of L. Hunt the sum of Twenty-Two ($22.00) Dollars in full payment of all loss, claims and damages on account of my gray pony backing into the said Hunt's motor car, near Crosby, Texas, on Sunday, July 23, 1911.

I have read this receipt carefully before two witnesses and understand the nature of this compromise and acknowledge that there is no legal liability on the part of the said Hunt for any injury done my animal.

It has been agreed in this settlement that the said Hunt hereby releases me from any claim he might have for the injury done his motor car by my horse.—W. Freeman.

Witness, A. T. Nelson.
Witness, C. H. McClellan.

The intelligence of the party claiming injury must, of course, be taken into consideration.—Lenoir Hunt.

SANTA FE-LOS ANGELES ROUTE

Janesville, Wis.—Editor Motor Age—What is the most direct route to Los Angeles—over the old Santa Fe trail or by the way of Denver? Through Motor Age I would like to know the best road. This will be a pleasure trip, and I will stop along the road at will. Any information will be highly appreciated.—J. E. Inman.

You will find a map in the issue of July 13 outlining the best summer transcontinental trip, with an option on the roads through Iowa.

From Janesville motor to Clinton, Ia., through Beloit, Roscoe, Rockford, Byron, Oregon, Dixon, Sterling, Morrison, Fulton, and Lyons, and follow the official transcontinental road across Iowa to Council Bluffs, passing through Dewitt, Grand Mound, Wheatland, Lowden, Clarence, Mechanicsville, Lisbon, Mt. Vernon, Cedar Rapids, Belle Plaine, Chelsea, Tama, Montour, Le Grand, Marshalltown, State Center, Colo, Nevada, Ames, Jordon, Boone, Ogden, Beaver, Grand Junction, Jefferson, Halston, Glidden, Carroll, West Side, Vail.

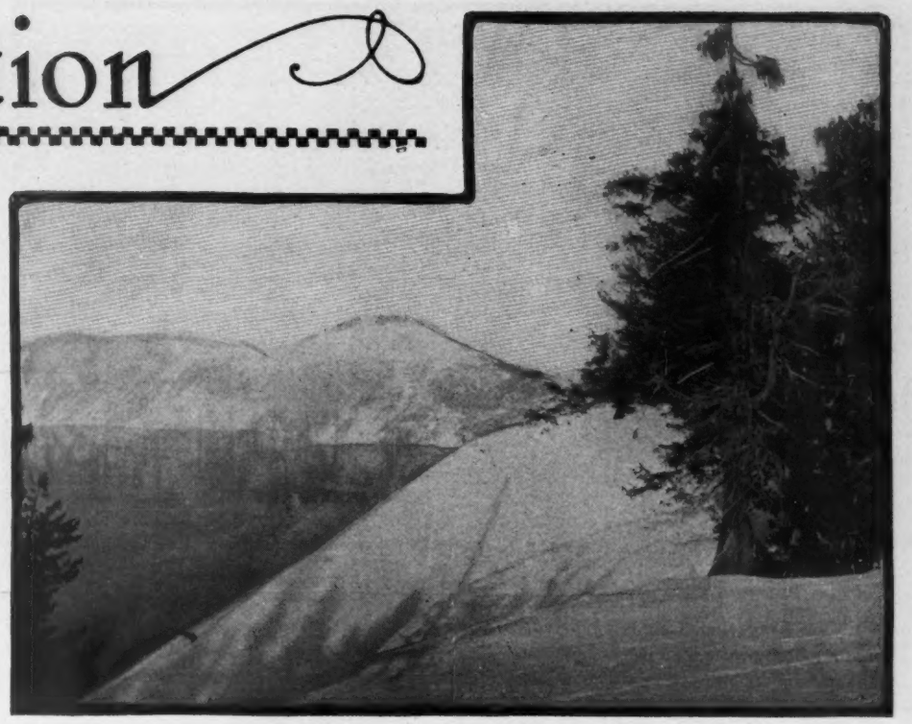
Information

Dennison, Arion, Dow City, Dunlap, Woodbine, Logan, Missouri Valley, Loveland, and Crescent.

In order to travel over the river-to-river road across Iowa it will be best for you to leave the above route at Sterling, Ill., and pass on to Davenport, Ia., by way of Galt, Lydon, Erie, Hillsdale, Moline and Gate. This famous road to Council Bluffs lies through Durant, Moscow, Atalissa, Iowa City, Coralville, Tiffin, Oxford, Homestead, Marengo, Ladora, Victor, Brooklyn, Grinnell, Kellogg, Newton, Colfax, Mitchellville, Altoona, Des Moines, Waukee, Ortonville, Adel, Redfield, Dale, Montieth, Guthrie Center, North Branch, Exira, Lorah, Atlantic, Marne, Walnut, Avoca, Mindon, Neola, Underwood and Weston. Excellent data on Iowa roads can be found in the Blue Book, volume 4.

Cross the river to Omaha, Neb., from Council Bluffs and follow the 1909 Glidden tour route as far as Julesburg through Elkhorn, Waterloo, Valley, Fremont, Ames, North Bend, Rogers, Schuyler, Benton, Columbus, Duncan, Silver Creek, Havens, Clarks, Central City, Chapman, Grand Island, Alda, Wood River, Shelton, Gibbon, Buda, Kearney, Odessa, Elm Creek, Overton, Lexington, Cozad, Willow Island, Gothenburg, North Platte, Hershey, Southerland, Paxton, Korty, Ogallala, and Brule. Should you decide to go to Denver from Julesburg you have a choice of two routes: Continue west to Cheyenne, Wyo., thence south to Wellington and Fort Collins, Loveland, Berthoud, Longmont, to Denver. The second choice is via Fort Morgan, from Julesburg, passing through Ovid, Sedgwick, Red Lion, Crook, Proctor, Iliff, Ford, Sterling, Atwood, Merino, Hillrose, Brush, Fort Morgan, Moreville, Bennett, Watkins, Sable, Denver. From Fort Morgan there is still another route, which has been laid out by the Denver Motor Club through Weldon, Orchard, Hardin, Kuner, Kersey, Greeley, Evans, Platteville, Ft. Lupton, Brighton, Henderson, Hazeltine, Model, Denver. On the other hand, if you do not desire to make Denver, keeping on the main thoroughfare from Julesburg to Los Angeles, takes you through Cheyenne, Sherman, Laramie, Lookout, Como, Fort Fred Steele, Rawlins, Pinor, Bitter Creek, Thayer, Rock Springs, Granger, Evanston, Ogden, Kelton, Battle Mountain, Lovelocks, Reno, Truckee, Colfax, Sacramento, San Francisco, Baden, San Mateo, Redwood, San Jose, San Juan, Salinas, Soledad, San Miguel, Obispo, San Luis, Arroyo Grande, Nipomo, Las Olivos, Santa Barbara, Casitas, Cala-Basas, and Los Angeles.

The trip from San Francisco to Los Angeles is a pleasant one, but if you do not desire to include it, take a short cut from Ogden to Montello, Ely, Tonapah, Goldfield, Independence, Owens, and Mojave. At Goldfield you will strike a toll road leading to Independence, and on the road to Mojave you will find stationed at frequent intervals the water stations and supply camps of the Owens river aqueduct. It is advisable to follow the Southern Pacific tracks from Mojave to Los Angeles. This direct route to Los Angeles is preferred to the one going through Death valley a distance of approximately 500 miles of desert, with water holes 30 to 50 miles apart.



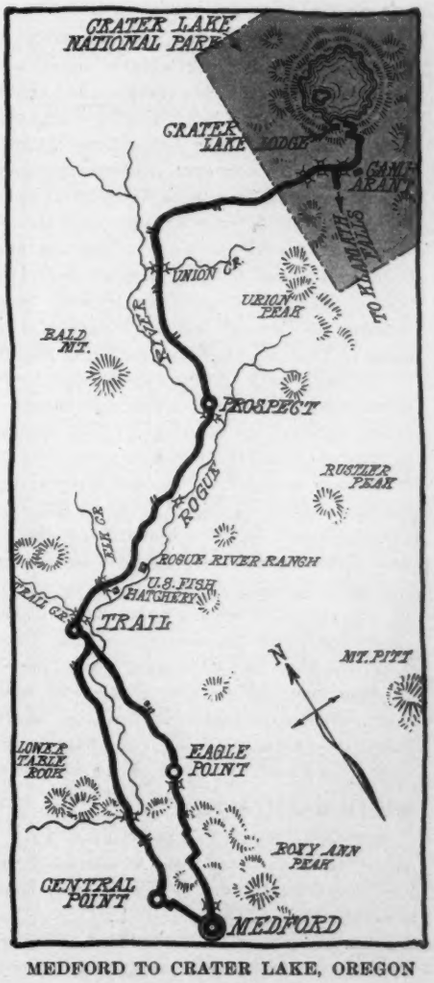
CRATER LAKE, ORE., AS IT APPEARS IN THE SUMMER TIME

At Rock Springs, Wyo., a road leads to the Yellowstone national park, and should you desire to visit this place of wonderful natural scenery you are referred to the issue of May 18 for the itinerary. Motor cars, however, are not allowed inside the park.

TRIP TO CRATER LAKE

Portland, Ore.—Editor Motor Age—I am enclosing herewith some photographs of Crater lake taken on a trip recently made by me in a 1911 Cadillac. The photographs were all taken on this trip excepting that showing the winter scene on the lake.

I reached the rim of the lake at 7 o'clock Thursday, July 13, after having bucked snowdrifts for 4 miles. This lake is located in Crater lake national park, which was created by congress May 22, 1902, and consists of 250 square miles territory on the summit of the Cascade mountain ranges in southern Oregon, this being 50 miles north of the California line. Crater lake rests within the crater of Mount Mazama in this part, which has an altitude of 8,000 feet. This crater is 5½ miles in diameter and 4,000 feet deep. The lake is surrounded by perpendicular walls 1,000 to 2,000 feet high.



MEDFORD TO CRATER LAKE, OREGON

FIRST CAR TO REACH CRATER LAKE THIS SUMMER

In reaching this lake heavy grades and much snow are encountered. From Klamath Falls to the lake is 60.8 miles. The road is not good and there are grades as high as 22 per cent; in fact, one that is approximately 25 per cent. We were compelled to go over and under snow 2 to 8 feet deep and many hours were consumed in making headway through this. As the illustration shows, part of the road was through the forest and much shoveling had to be done to get a pathway.

The route to Crater lake by way of Klamath Falls is a particularly scenic one in that the tourists travel the entire length of upper Klamath lake. On this part of the trip there are grades ranging from 10 to 31 per cent. The route goes through what is known as Klamath agency, 31 miles from Klamath Falls, and thence through Ft. Klamath to Camp Arant. From this point it is but 4 miles to Crater lake. There is a good route also from Medford to Crater lake, a distance of 82.8 miles. This is by way of Eagle Point, 13 miles; Trail, 26 miles; Prospect, 48 miles; Camp Grant, 78 miles, and thence 4 miles further to the lake. This course follows the road river and is a scenic ride from start to finish. The road river valley through which the first part of the trip goes is famed for its horticultural wealth. The valley narrows as Prospect is reached and here the road crosses the noisy rapids of the river where an immense power plant has been constructed. From Prospect the road leads through a vast forest of sugar and yellow pine, spruce and hemlock. The trip from Medford by motor stage starts at 8 o'clock and reaches the lake at 6 P. M.—C. B. Miners.

SOUTH DAKOTA TRIP

Aberdeen, S. D.—Editor Motor Age—I expect to drive a car from Aberdeen, S. D., to Belle Fourche, S. D., and wish to have a route covering same.—B. L. C.

From Aberdeen to Redfield is about 42 miles over a fine road going about a mile west and then south without a turn of any consequence; Redfield to Wolsey is about 35 miles over a road not quite so good following the railroad fairly closely through Tulare, Spotswood and Bonilla. Wolsey to Rapid City will be found in the communication from Polo, Ill., in this issue and the balance of the trip you can follow the railroad in a general way through Sturgis to Belle Fourche or go to Deadwood through Black Hawk, Piedmont, Tilford, Beaver Siding, Sturgis and along the Hill trail to Whitewood and Deadwood. From Deadwood follow the St. Onge road to Belle Fourche.

YELLOWSTONE VACATION ROUTE

Raymond, S. D.—Editor Motor Age—Through the Routes and Touring Information department will Motor Age kindly publish a route from Redfield, S. D., to Yellowstone Park with also a few side routes in Wyoming where one could enjoy a vacation in rough country and still have fairly suitable roads for a car.—W. S. C.

Redfield to Wolsey, a distance of 35 miles, is through Tulare, Spotswood and Bonilla and keeps to the railroad fairly well all the way. You are referred to the communication from Polo, Ill., and then to the one from Aberdeen, S. D., in this issue for the trip as far as Belle Fourche, S. D. The route to Yellowstone lies through Sundance via the Sundance hill road, thence through Moorecroft, Wyo., and Gilette to Sheriden and Billings, Mont. Leave Billings on the south side of the Northern Pacific tracks, going through the towns of Laurel, Park City, Columbus and Merrill; then follow the old trail from Merrill through Dead Man's canyon to Big Timber; straight west on the south side of the Northern Pacific tracks to Springdale; continue on the south side of the railroad to Livingston, then south to Gardiner, the northern and official entrance to the park. As you probably are aware, motor cars are not permitted within the gates of the park. The rules governing the park, and various roads leading to it, as well as information of general interest, will be found in Motor Age issue of May 18, in the Routes and Touring pages.

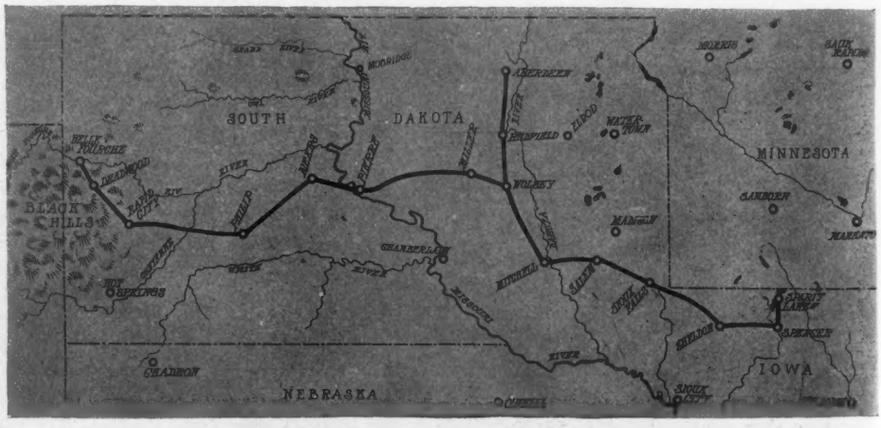
Motor Age does not know of any side trips in Wyoming, unless you should wish to motor to some point along the route to Cheyenne, Wyo., returning over the same road, but at Bozeman, Mont., which is just west of Livingston, Mont., the Commercial Club of Bozeman has established fully equipped camps at convenient points for those who desire to spend a little time in that part of the country where there is good hunting. This might be of interest to you.

For Cheyenne you can return from the park to Billings, Mont., and then pass through Basin and Thermopolis along the C., B. & Q. railroad tracks. Moneta, Mokoma, Casper, Douglas, Foxton, Wheatland and Goldsmith complete the itinerary.

There are two routes through North Dakota leading to the Yellowstone Park and the issue of July 27 shows these in a map on page 28. By motoring to Aberdeen, Ellendale, Monango, Edgerly and Jamestown you will strike one of these.

ACROSS-NEBRASKA ROUTE

Kimball, Neb.—Editor Motor Age: Since there is a discussion regarding a so-called official public highway across the state, permit me a word regarding same. The stand taken by C. E.



MAP SHOWING SOUTH DAKOTA ROAD

Oehler regarding the old Overland trail is well taken, yet, with the divergence at Julesburg, Colo., cuts out 100 miles of the western end of the state entirely. From Julesburg, Colo., to Chappell, Neb., then to Sidney and Kimball following the main line of the Union Pacific Railroad to Pine Bluffs' Wyo., on into Cheyenne is over one of the most perfect natural roadways to be found in any part of the country. From Cheyenne to Denver, Colo, the route is over the Cheyenne-Denver roadway, a route traveled by thousands of tourists yearly and always in excellent condition. The conspicuous absence of sand, a terror to all motorists, is one of the features to be taken into consideration in laying out the across-the-state highway.—Fred R. Morgan.

STAR CITY-PITTSBURG ITINERARY

Star City, Ind.—Editor Motor Age—Kindly give me a good route from Star City, Pulaski county, Indiana, to Pittsburg, Pa.—J. L. McBride.

A good route according to the Blue Book is to go to Logansport, 19.7 miles, through Oak and Royal Center; thence to Indianapolis, 70.2 miles, through Deer Creek, Burlington, Middlefork, Boyleston Station, Kirlin, Augusta, Indianapolis. From Indianapolis, Ind., to Columbus, O., 171.6 miles, you will motor over the national highway, which is a long straight road through a level country, going through Cumberland, Greenfield, Charlottesville, Knightstown, Ogden, Lewisville, Dublin, Germantown, Centerville, Richmond, Englewood, Vandalia, Fountaine, Brandt, Donnelsville, Springfield, Harmony, Vienna, Somerford, Alton, Columbus.

From Columbus to Wheeling, W. Va., 128.1 miles, is through a rolling country. Go via Reynoldsville, Kirkville, Hebron, Jacktown, Linnville, Brownsville, Gratiot, Hopewell, Sterling, Zanesville, Norwich, New Concord, Cambridge, Elizabethtown, Fairview, Hendrysburg, Morristown, St. Clairsville, Bridgeport, Wheeling. After leaving Zanesville you will have several toll charges to pay.

From Wheeling to Pittsburg is 61.7

EN ROUTE TO CRATER LAKE, OREGON, WHICH IS SITUATED ON THE SUMMIT OF THE CASCADE MOUNTAIN RANGES

Latest Bulletins on Roads from Touring Club of America

Editor's Note—At the present time scouts representing the Touring Club of America are engaged in studying road conditions in various parts of the country. Herewith are found reports made by them as to the condition of the highways in parts of Canada, the middle west and New England which may prove of benefit to touring motorists.

FROM Uniontown, Pa., to Cumberland the Cumberland turnpike is being greatly improved and will be in good shape for 1912. Several pieces of macadam already are in and the balance of the road is good, although rough and stony in spots. From Cumberland to Hagerstown over the pike is reported as very bad. Tourists are sent from Cumberland to Bedford and then east, or if going south are sent by way of Romney and Winchester and then south.

From Cumberland directly south is a nice shale road to Monterey and then one crosses the mountains on a fairly good dirt road, whch is to be improved this summer. The trip is a delightful one and the scenery is fine. The route has several fords that might be bad in very wet weather. The road has water bars and ditches the entire length, but they are not bad. This makes a trip from Pittsburg to Hot Springs, which is 88 miles shorter than going by way of Cumberland, Winchester and Staunton, and is well worth taking.

From Hot Springs to Staunton the road is good. The bridge over Cow Pasture river, which is being built, makes the trip 6 miles shorter and a better road.

From Staunton to Winchester the national highway is in good shape and the same conditions exist in Hagerstown, it is reported.

The road from Newmarket to Luray is a little rough and stony, but very good on the other side and the trip can be made in an hour easily—14 miles—and should not be missed by anyone going through the Shenandoah valley, as the caverns are wonderful—said to be the only one like it on this continent.

From Winchester to Berryville and Harpers Ferry into Frederick. One finds the road from Knoxville to Frederick being macadamized and will be finished by fall. Two toll gates have been abolished.

From Hagerstown to Gettysburg one leaves the national highway. Going to Emmitsburg saves two bad hills, but the road from Emmitsburg to Gettysburg is in bad shape, as it is being repaired.

From Gettysburg to Lancaster the best way is via York on the direct line. This has been reported bad as far as Abbottstown, but it is much better than going to Littletown and then into York. It is very fine from York to Lancaster.

Tourists should bear in mind the fact that about 5 miles of the route beyond Schroon Lake, N. Y., is almost impassable by reason of the new construction now being done on that route. Tourists should follow Blue Book route 221 to and beyond Schroon Lake about 1½ miles, where there is a right turn that goes down past Eagle and Paradox lakes over a scenic winding woods road into the village of Ticonderoga. From here is a fine gravel road to Crown Point village and beyond, connection being made with the asphalt macadam highway that winds along the base of the cliffs and leads into Port Henry. Passing through the village and going straight out, following Blue Book route 223, is a fine gravel and part macadam road leading into Westport, whereby the lake shore is found the famed Westport inn. From here it is but a short drive through a beautiful mountain pass over a fine road into Elizabethtown to the doors of the Windsor or Deers Head inn.

The next step in the journey should include the famous Ausable chasm, where a day's stop is fully warranted and necessary if one would see the splendors of the chasm.

On from here a fine highway leads to Bluff Point. This completes what any tourist will vote the finest drive in the country.

Bretton Woods, N. H., to Portland, Me., via Poland Springs. The road is in excellent condition to Bridgeton. It is somewhat heavy going to Webb's Mill, but the balance is good.

Portland to Augusta via Lewiston. In fair condition. Connection to Belgrade lakes in good condition.

Augusta, Me., to Brunswick. In good condition to Gardner. This route will be changed in 1912 south of Gardner to run via Richmond, East Bowdinham and Bowdinham locally termed the river road. It is in good condition all the way.

Portland to Bangor, Me., via the coast. In fair condition during dry weather. This route is run over clay and sand roads and is not desirable in unsettled weather. It is very picturesque.

Bangor to Patten and Fort Kent. This is a new route and is a most desirable highway, running through an unusually attractive country. With the exception of from 4 to 6 miles the trip to Patten is over smooth gravel roads, in a country where distances amaze one. From Patten to Fort Kent the trip is somewhat tiresome on account of practically continuous forest travel, with numerous steep grades. A more desirable way north of Patten would be via Houlton, Presque Isle, Caribou, New Sweden and Guerette.

Bangor, Me., to Houlton and Fort Kent, 209.3 miles, via Mattawamkeag, Houlton, Caribou, New Sweden and Guerette. It is unusual to find a more attractive trip of equal distance. Fully 90 per cent of the road is good gravel, the remaining 10 per cent equally divided in fair dirt, sand or corduroy. The country is very rolling, giving numerous extensive views of a wonderful farm land and dense forests with numerous mountains standing in bold relief. This and the previous route carries one through the greatest fishing and game country to be found in the state of Maine and the greatest portion of the road follows the numerous rivers that drain that wonderful forest and lake district.

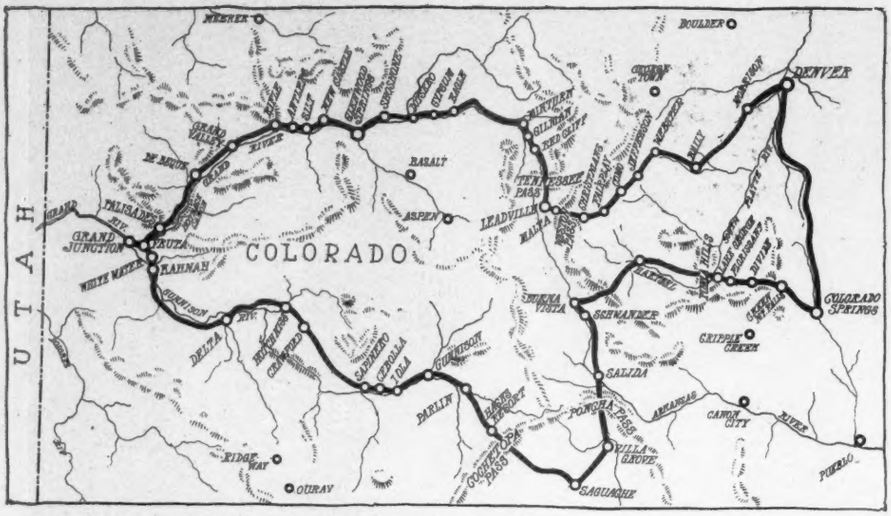
Patten to Houlton, 37.2 miles, unusually good gravel road, through rolling country with several most attractive views of Mount Katahdin and distant mountain ranges to the north and west. The extensive potato-farming districts of this great county of Aroostook amaze the motorist who has formed the idea that northern Maine is one great dense forest.

Fort Kent to St. John, via the St. John river. Like the previous routes this road passes through a beautiful country with the great hills on either side of the river and with St. Johns river visible at almost every point. In wet weather this road is not as desirable as the interior route, there being the least amount of clay at several points.

Moosehead Lake to Skowhegan, Me., and points west and south, via Blanchard, Kingsbury, Brighton and Athens. Twenty-five per cent through somewhat hilly country with narrow roads of rock surface, the remainder being fair to good gravel roads. This is a much shorter between the above points than via Gilford and Newport.

Bangor, Me., to White Mountains. Only in fair condition to Newport. The road is good from Newport to Skowhegan and Farmington. From Farmington to Bethel is only fair; Bethel to White Mountains, fair to good.

Augusta to Tangeley Lakes, via Belgrade Lakes: The roads are narrow but in good condition practically all the way.



CIRCLE TOUR OUT OF DENVER

miles, passing through West Alexander, Claysville, Washington, Pa., Cannonsburg, Bridgeville, Carnegie, Pittsburg.

There are many alternate routes, all of which are good. On your return trip you might go via Canton, Mansfield, Bucyrus, to Lima; thence to Logansport through Marion, Kokomo, and Huntington, Ind.

DAKOTA TO CALIFORNIA

Miller, S. D.—Editor Motor Age—Will Motor Age kindly publish the best route from Miller, S. D., to Pasadena, Cal., via Denver and Grand Junction, Colo.? Would also like a route to the same point via the state of Oregon. Which would be the better route to travel during August and September?—R. H. Andrews.

The most feasible route though somewhat roundabout, road conditions being considered, is to go to Omaha, thence to Denver and Grand Junction. From Miller, S. D., go to Sioux Falls, S. D., through Woolsey, Huron, Woonsocket, Mitchell, Riverside, Fulton, Farmer, Spencer, Salem, Montrose, Humboldt, Hartford, Sioux Falls. From Sioux Falls go to Rock Rapids, Ia., through East Sioux Falls, Ben Claire, Larchwood, Letcher, Rock Rapids; thence to Sheldon, LaMars, Sioux City, Ia. From Sioux City follow the Blue Book route through Salix, Sloan, Whitney, Onawa, River Sioux, Missouri Valley, Omaha.

Leaving Omaha follow the official transcontinental route, which is through Fremont, Columbus, Central City, Grand Island, Kearney, North Platte, Ogalalla, Julesburg, Sterling, Fort Morgan, Denver.

For the route from Denver to Grand Junction Motor Age quotes from Motor Field of Denver, which outlines this mountain tour in detail:

"One of the most extensive and delightful trips out of Denver is through Turkey Canon to Grand Junction by way of Leadville and Glenwood Springs, returning with a swing through Delta, Gunnison, Saguache, Buena Vista and Colorado Springs. Leaving Denver, the route leads to Morrison and thence to Baileys. From this point two steep grades are encountered on the way to Webster. Turning to the left and crossing the railroad and river, the climb of Kenosha hill is begun. To Jefferson from Kenosha is 5 miles. The railroad is then followed west over good roads 7 miles to Como, and then straight on 10 miles to Fairplay, which is 90 miles from Denver. A choice of two routes out of Fairplay is offered. Either the road through Weston pass or through Trout creek pass, about 25 miles south, may be taken. Through Weston pass, Christman's ranch, 15 miles from Fairplay, offers a convenient resting point. From this point to the top of Weston pass, 11,700 feet, there is a climb of 2,500 feet in 7 miles. From this point there is a steep down grade. Just before reaching the Arkansas river the road turns north a few miles to join the Buena Vista road leading to Leadville. At Malta a turn to the right should be made at the schoolhouse. When the road forks the proper turn is to the left of another school. The distance from Weston pass to Leadville is 28 miles.

"Leaving Leadville the road to Red Cliff goes over Tennessee pass. Leaving Leadville and reaching a gulch the road forks. The left turn down the gulch should be taken, crossing the river and taking a short easy hill. The road then swings back to the west and north with good going until near the top of the Tennessee pass. Here is encountered a hundred yards of 30 per cent grade with loose rock roadbed. The top of the pass is 8 miles from Leadville. The road to Red Cliff is readily followed, but is steep and full of ruts. From the pass to Red Cliff is 18 miles, and 2½ hours can be counted upon to make the 26 miles from Leadville. Battle mountain with negotiable grades is next climbed. Beyond Gilman there is a drop to the Eagle river requiring careful driving. Seventeen miles from Red Cliff is Minturn. Twenty-five miles farther is Dotsero. Here the road crosses the Grand river and turns down stream.

"From this point to Shoshone sharp turns and rocky going make careful driving necessary. One touring party, obliged to make half of the 19 miles to Glenwood Springs after dark, made the distance in 2 hours and 40 minutes. Sharp turns mark the road from Glenwood to Newcastle. Arroyas and rutty going characterize the trip to Rifle, 16 miles away, through Silt and Antlers. Two hours and 20 minutes should be allowed for the 29 miles between Glenwood and Rifle. From Rifle to Grand Valley is 17 miles, and 1 hour and 25 minutes is a fair speed.

"Leaving Grand Valley for De Beque, 13 miles away, the river should be crossed at Grand Valley and recrossed at De Beque. The road maps show the good going on the wrong side of the river. Pointing for Grand Junction the road soon turns from the river and runs nearly south for several miles, climbing the divide and striking Plateau creek at Silver Spring ranch, 12 miles south of De Beque. The main road crosses the bridge to Mesa but it is preferable to take the turn to the right down the creek to Grand Junction. Plateau creek is followed to its mouth and the road then leads through the canon of the Grand river to Palisades. There are no steep hills but there are narrow places where care is requisite. From Palisades to Grand Junction there is a level stretch of 12 miles.

"In leaving Grand Junction for Delta it is well to follow the telephone lines all the way. At Whitewater, 11 miles out, the route continues through the open town square and then turns left. At Kannah the creek is crossed and the ascent up the hill made. Arroyas and surface rock make going hard.

"Leaving Delta the road runs on the south bank of the Gunnison river 8 miles, then crosses the river and generally follows the railroad nearly into Hotchkiss. Crawford is a dozen miles from Hotchkiss. Leaving the last named town the route is south on the main street across the north fork of the Gunnison, taking the second road leading to the right. The telephones are a safe guide.

"Going south from Crawford a creek is crossed. Fourteen miles out there is a schoolhouse. Here a turn is made down to Crystal creek. After about 2 miles, trouble looms up in the way of rough and steep going. Block and tackle are advisable or at least some outside help. The road runs nearly south to Mesa creek. Avoid the left-hand road to the saw mill and take the right-hand turn. The road is good from the top of the hill to the beginning of the sharp descent at the south edge of Black Mesa.

"For 3 miles the road overlooks the Black canon of the Gunnison and then strikes into Curricanti creek. From this point there are 10 miles of fair going to Sapinero. From this town the route follows the railroad on the north side of the track 7 miles to Cebolla. Iola

is 9 miles and from Iola to Gunnison 12 miles. The river is not crossed at Iola, but the north road is held until within 2 miles of Gunnison. There are 12 miles of good road between Gunnison and Parlins. Crossing the tracks at Parlins the direction is south, but owing to the multiplicity of roads careful inquiry should be made at Parlins. Hack's resort is 18 miles out. Water should be taken at Parlins. From Hack's to the top of Cochetopa pass there is 12 miles of easy climb. Then comes a descent of 30 miles down Saguache creek to the town of the same name. Two miles from this town take the left-hand road for Villa Grove, 19 miles away. The going continues good to the top of Poncha pass. Descending to Poncha Junction the grade is steep but without dangerous places after crossing the south fork of Arkansas.

"To go into South Park a turn is made at Schwanders, 3 miles from Buena Vista. The C. and S. tracks are crossed once. As they are approached again the road forks to the right and crosses the tracks about 50 feet from the main road and goes up a moderate grade. In another half mile the road forks. To the left is the old road and to the right the new, which is preferable. From the C. and S. crossing to the top is 12 miles. From the top of the hill there is a choice of two roads to Denver. The northern is through Fairplay, Como and Jefferson. It is good and short. The southern road leads through Hartsel, 16 miles, Divide, and Ute pass to Colorado Springs. From Hartsel the road runs east 2 miles and then turns to the left across the river. About 1½ miles beyond the bridge the road forks. It soon turns to the right and runs east 4 miles. It then turns up through a pass in the Puma hills. Two miles below the top the road forks. For Florissant the right-hand road should be taken.

"Passing Lake George the Colorado Midland tracks come in sight on the right. The tracks are crossed at Florissant, 22 miles from Hartsel. Going up hill the left-hand road leads to Colorado Springs. It is 9 miles of good going up the hill to Divide. Here the railroad is crossed and a sharp turn is made to the right. To Green Mountain falls there is a down hill roll of 11 miles. About half way from Divide to Green Mountain Falls a good road turns to the left to Woodland Park. From the falls to Colorado Springs there is a 15-mile drop, the first ten being through the Manitou district. The mileage for this trip is about 815 miles."

As the roads from Grand Junction to Salt Lake City are in bad condition, the most practical thing to do would be to ship your car to Thistle, Utah, about 60 miles from Salt Lake. Motor Age is advised that the roads from there to Salt Lake City are good, thence to Ogden.

At Ogden take up again the official transcontinental route going to Pasadena, Cal., through Kelton, Lucin, Wells, Elko, Palisade, Battle Mountain, Lovelocks, Rena, Truckee, Colfax, Sacramento, Stockton, San Francisco; then follow the coast to Pasadena, passing through Solidad, San Miguel, San Luis Obispo, Los Olives, Santa Barbara, Los Angeles, Pasadena.

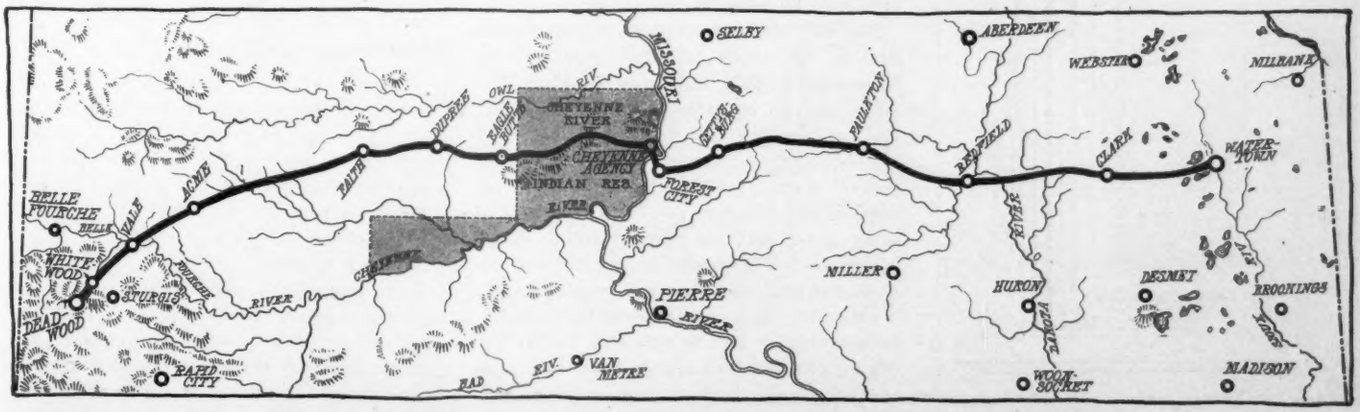
This is the preferred route for summer touring, the summer route via Phoenix, Ariz., not being advised because of the extreme heat. A northern route through Montana, Washington and down the coast through Oregon and California would be enjoyable during the summer touring months.

MINNEAPOLIS TO DEADWOOD

Deadwood, S. D.—Editor Motor Age—I am giving herewith some notes on a motor car trip from Minneapolis to Deadwood which I think might be of interest to some of the readers. Deadwood is in the mining center of the Black Hills, with much picturesque scenery which is being more and more appreciated by the motorists of eastern South Dakota and Minnesota.—N. T. Mason.

The roads from Minneapolis to Watertown, S. D., either by way of Milbank or by way of Glencoe, are fair in good weather. From Watertown following the C. and N.-W. railroad via Clark, Redfield, Falkton and Gettysburg to Forest City on the Missouri river the roads are excellent. Cross the river by ferry to Cheyenne River Agency, then cross the Indian reservation until you strike the C. M. and P. S. railroad. Twenty-five miles each side of Faith the roads are poor and liable to change by settlers; from Sulphur following the Bismarck trail to Deadwood they are good. This trip should not be undertaken during the spring or late fall, when there is likelihood of heavy or long continued rains. The following is the itinerary from Cheyenne River Agency on the Missouri river to Deadwood:

Miles	
0	Cheyenne River Agency. Down the river on Main street, past agency houses; cross two small bridges, then first turn to right; ascend hill westerly to rolling table land. At summit keep to left through wire gate.
8	Join road coming in on left with telephone line, follow line ¼ mile to wire gate; keep to right, bearing away from telephone.
12.5	Join road coming in on left, telephone line about a mile to the left; keep to the left; again to the left.
17	Agency telephone line crosses road; join road coming in on right; take left road, leaving small station on Milwaukee railroad in sight 2 miles to right; keep to left along rolling ridge with railroad in distance at right.
23.9	Bottom of valley and wire gate; keep to right for hill.
25.7	Wire gate.
27.2	Wire gate.
28.4	Wire gate; follow general course of Milwaukee railroad on right along old agency trail with plowed fire guards. Roads fine.
33.9	Cross railroad track.
39.7	Bottom or ravine near Camp 5.
44.9	Cross to south side of Milwaukee railroad.
47.3	Wire gate.
48.7	Cross to north side of railroad.
52.4	Eagle Butte station; hotel; cross to south side of railroad. Rough road.
62	Cross to north side of railroad.
64.4	Cross to south side of railroad at water tank or under trestle.
67	Keep to right twice.
68.6	Bottom of ravine near railroad trestle; wire gate.
69	Cross to north side of railroad.
72.4	DuPree station; hotel; cross to north side of railroad and follow same.
95.3	Faith; roads poor; go 1 block south of station, then west
104.7	Turn to left angling southwest; a few rods from there keep to right.
147.7	Sulphur P. O., general store; no hotel; continue southwest on Bismarck trail.
156	Acme P. O. visible in southwest distance remarkable truncated peak, Bear Butte, near south base of which is situated Ft. Meade and Sturgis, the county seat of Meade County.
161.6	Elm station.
163	Take left hand road; right leads to Newell.
172	Cross bridge; go due west along lane.
175.9	Turn to left and cross bridge.
176.9	Turn to right direct west.
177.9	Turn to left, south.
179.9	Follow Belle Fourche river; then cross on bridge first turn to right, west.
180.8	Vale, Butte County, situated due north of Bear Butte.
182	Continue west.
183	Continue west.
184.3	Cross government irrigation ditch.
186.6	Turn to right, west.
188	Cross bridge Whitewood creek filled with tailings from gold mills.
189	Turn to left; south.
194	Again cross creek and follow same.
199.4	Again cross creek.
200.9	Reach Whitewood, passing east side of depot; leave Whitewood on road east side of Lane hotel; follow general direction of railroad southwesterly.
211.9	Deadwood.


SELBY
ABERDEEN
WEBSTER
MILBANK
MISSOURI
RIVER
CHEYENNE RIVER
CHEYENNE AGENCY INDIAN RES.
DUPREE
OWL
EAGLE BUTTE
FAITH
ACME
BELLE FOURCHE
VALE
WHITE WOOD
DEAD WOOD
STURGIS
RAPID CITY
BELLE FOURCHE RIVER
CHEYENNE RIVER
BAD RIVER
VAN METRE
PIERRE
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The Readers

USING TIRE PROTECTORS

MINNEAPOLIS, Minn.—Editor Motor Age—Will Motor Age, through the Clearing House, inform me as to the advisability of using tire protectors in new casings, that is, a tire protector that is not cemented inside? I am having a lot of trouble in regard to punctures and have seen several tire protectors on the market, those that are cemented inside and those that are not, and several people to whom I have spoken have said that they have had friction trouble and their inner tubes have been blown out.—S. S. Brooks.

If the tire protectors are properly applied and the soap stone or French chalk well distributed and rubbed into the surface of the casing or protector that comes into contact with the tube, there should be no trouble from friction. It is difficult to give advice that will prevent punctures; it is, for the most part, a matter of luck and care.

DEFENDS THE MAGNETO

Bay City, Tex.—Editor Motor Age—I notice in the July 27 issue of Motor Age A. D. Carpenter, of Sauk Center, Minn., hops on the poor old magneto, that one great source of economy to the man who really does use his car. Now we will take the case of which Mr. Carpenter spoke wherein he had to carry a set of dry cells to the man 10 or 12 miles out. Honestly, wasn't it a case of carelessnes to be found on the road with a set of batteries so old and weak that they would not start a motor, much less carry it in, in case of emergency? Then again I suppose the man in question never had heard that a little salty water applied to each cell through a hole dug in the waterproofing at the top would renew a set of batteries sufficiently to operate a motor for several miles, and salt can be secured from any farm house; or that he did not think to jack up one of the rear wheels, throw in the second gear and by turning the raised wheel revolve the motor with sufficient speed to start on the magneto, providing he was not able to start on the magneto in the ordinary manner. I think those who have had much experience will agree with me when I say that there are very few magnetos today that will start a car if they are anywhere near properly adjusted, providing one goes at it in the right manner.

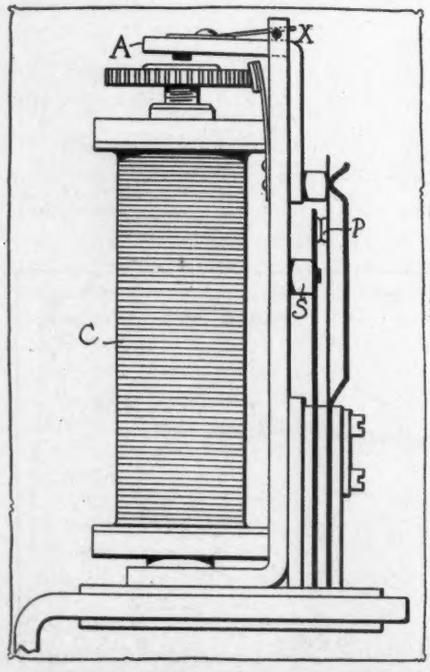


FIG. 1—THE DELCO CONTROLLING RELAY

Mr. Carpenter says he has found that a good storage battery will run 1,000 miles per charge—50 cents per charge. I think that 1,000 miles one of a few exceptions and that the 50 cents charged is still another exception outside the larger cities, as it has been my experience to pay from 75 cents to $1 in the smaller towns. He says that but few garage men understand magnetos. I wager that there are more garage men who can quickly and skillfully repair a magneto, than there are electricians who can accurately recharge the storage battery today, without giving it an overcharge, which everyone knows is the beginning of the end.

Also it is my opinion that anyone who will let his dry cells get so weak they will not start the motor would be pretty sure to let a storage battery exhaust itself to the same point, which also is a good beginning of death to them. We will admit that a magneto is rather costly to begin with; that is, first cost, and also costly in the hands of the inexperienced, careless or inquisitive. But it is no uncommon thing for the magneto found on the cars built today to give good active service for 5 or 6 months every day without giving the least bother to owner or driver, providing they receive the proper care, which is to let them alone—with the exception of a little oil every 800 or 1,000 miles—unless you know what you are doing and know it well. I am in the market for storage batteries that will do that and I think many others are also, but as yet they have not developed to that point.

We will take up the case of the storage battery of which the first cost will be from $15 to $25, according to class, the same as the magneto. Then comes the cost of recharging, which comes pretty regular, and if the car sees much service, pretty often; not much at a time, of course, but in the end will amount to more than magneto repair bills. Then comes the inconvenience at time of recharge should one want to use the car. It is necessary to have another battery, which means another $15 to $25 cost for a new set of dry cells at about every recharge of the storage battery, for a set of dry cells will deteriorate so they will not be much good after once or twice using while storage battery is being recharged, and this means more cost to be added to the battery side. Then just think what an awful feeling it must be to be out on the road somewhere and have the motor start to missing and jumping and know the battery is playing out, and think, "Oh! for a magneto to switch over on and get into town before this battery goes."

Mr. Carpenter says that comparatively few motorists are competent to repair or adjust a magneto when it goes wrong, which same can be said of the storage battery, I think. I never have known in my experience where an absolute "stop and stay there" case could be truly traced to the magneto. Cases have, and do occur, where a loose connection or something of that nature causes a stop, but can that be traced to any fault of the magneto? Hardly, I think—rather more carelessness on the part of the operator. Such things happen to batteries also.

So, if the incompetent motorist Mr. Carpenter speaks of will try not to make the magneto do the work it is built for, and, as is usually the case, that of the carbureter, radiator and various other things, but bring it on to a competent man, even if it does miss a little coming along, he will find his bills not so large for magneto work. He speaks of so much depending on the rotation of the armature to get the spark with magneto, as it is generated by friction. It is my candid opinion that it will pay Mr. Carpenter to investigate the theories, principles and actual working of a magneto before he condemns it to the scrap pile, for I have gone through many different makes of magnetos and have the first evidence to find yet where one generated any juice by friction.—Friend of the Magneto.

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

A MUFFLER DISCUSSION

Dallas, S. D.—Editor Motor Age—In discussing the subject of motor power a few days ago I claimed that a motor would give more power and mileage per gallon of gasoline with the muffler off entirely, than with it on and the cutout closed; others said I was rwong. Who is right?—A Reader.

In a race over a smooth road where the maximum power of the motor would be required, or in a hill-climbing contest, in the majority of cases more power would be obtained by removing the muffler entirely. In an economy run, however, it

Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

might be possible with some motor constructions and designs to get a greater mileage per gallon of gasoline with the muffler intact and the cutout closed. The reason for the latter is that some motors will run most economically at a car speed of about 25 miles per hour, and are capable of developing sufficient power to run the car at this speed, without taking a full charge of gas into the cylinders. Therefore, a certain amount of back pressure might be beneficial in that it would prevent full charges of fresh mixture from being drawn into the cylinders. Both of you might be right under certain conditions.

DELCO IGNITION SYSTEMS

Erie, Ill.—Editor Motor Age—Will Motor Age please give a diagram of the electrical circuits of Delco ignition system, also show the relation of the switch springs to the circuits.—Dana Seger.

Figs. 1, 3 and 4 show the wiring and circuit diagrams of the Delco ignition systems. Fig. 4 is the 1910 system, Fig. 3 is the 1911 system and Fig. 1 is the relay. The illustrations are practically self-explanatory. The four timer wires go to the four outside binding posts of the coil box; the center one, which is the common wire, leads to the carbon or positive pole of the battery. The single outside terminal is connected with the zinc of the battery. The other outside terminal of the relay connects with the outside terminal of the switch. The third terminal of the relay is connected with the center terminal of the switch. A ground wire connects the terminal of the switch which holds it to the dash with the engine frame. The operation of the 1910 system and the relay were explained more in detail in the answer to Henry, Sheldon, Ill., in the Readers' Clearing House for April 6.

The circuit is a simple one; from the carbon of the battery it passes to the common or center connection of the coil box through one of the primaries and one of the commutator or timer contacts to the ground. Through the ground it passes to the switch; from there to the heavy winding of the relay, which is the circuit-breaker, and back to the zinc of the battery, thus completing the circuit. In addition to the circuit just traced, an extremely small current passes through a fine winding on the relay.

This minute current follows the same course exactly as the large current as far as the switch. There it comes out on the center switch terminal and goes to the center relay terminal, where it passes through the fine winding, coming out on the same binding post as the heavy current, thus completing the circuit. This auxiliary circuit takes a separate path at the switch so that the starting button at the top of the switch can be utilized to open and close it when desired. This circuit is graphically shown at G, Fig. 2.

The controlling relay is used for the purpose of breaking the primary circuit, and thereby producing a spark from the secondary windings of the induction coils. It takes the place of the four vibrators on an ordinary coil unit, as it acts for each coil in turn as the commutator makes connection. In this way it replaces what is commonly known as a master vibrator. It differs from the ordinary vibrator, however, in that it uses but one spark for each contact of the commutator.

The coil of the controlling relay is composed of two windings; one heavy winding, P, through which the primary circuit passes when the timer makes contact, thus drawing down the armature and opening a contact in the primary circuit. With this opening the armature would again return to its first position, making contact and breaking it again as an ordinary vibrator, if it were not for a second fine winding wound on the same coil, but shunted around the contact. The current flowing through this prevents the armature from closing the primary circuit until the timer slips off contact, when the auxiliary circuit is open, thus releasing the armature and allowing the contacts to come together and be ready to break the circuit when the timer makes the next contact. When the button at the top of the switch is pushed in, it opens this auxiliary or holding coil and permits the armature to vibrate the same as any vibrator, sending a shower of sparks to the cylinder for starting the motor in an easy manner.

The switch, which is the only thing located on the dash, takes care of both battery and magneto. It has three positions —off, battery and magneto. Its operation is as follows: When the lever is at off position the push button at the top when pressed in will lock; this converts the controlling relay into a vibrator, and facilitates cranking in cold weather, as a number of sparks will be delivered to the cylinder instead of a single one.

To start from the spark one has but to kick the switch lever over to the battery side, and if the motor does not start press in the button for a moment. This will start the motor if the proper charge is in the cylinders. The switch may also be kicked over to the magneto side and then the push button pressed in with the foot, which will start the motor from the battery, and as soon as the proper speed is reached the magneto will take care of it after that.

The system designed for the 1911 cars is shown in Fig. 3. It uses only one non-vibrator coil, instead of four, with a secondary distributor. The timer is a single-point contact operated on the same shaft as the secondary distributor. The interruptor and the switch are like those used in the 1910 cars.

TWO-CYCLE DESIGN

Des Moines, Ia.—Editor Motor Age—I am trying to design a two-cycle motor, but I have trouble in locating the ports. That is, I do not know how far down in the cylinder walls to place them and what the distance between the inlet and exhaust ports should be. I would consider it a favor if through the medium of Motor Age I can have this information. Where can I get a book on two-cycle motors?—L. Simks.

The state of the art in design of two-cycle motors for motor cars is not such that any particular design can be considered standard practice. Motor Age knows of no book treating exclusively on the design of two-cycle motors. Works on motor design and construction rarely devote more than a chapter to this type and that in a rather unsatisfactory manner for one who is actually engaged in a two-cycle design.

So far as the location of the ports is concerned, it is impossible to give any definite figures as this will depend on the rest of the design and the size and speed of the motor. The illustration, Fig. 2, will show the relation of the ports in the El-

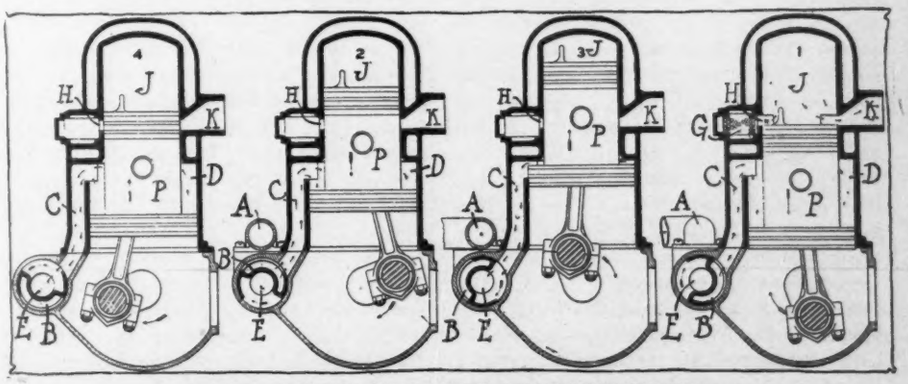


FIG. 2—POSITIONS OF PORTS IN ELMORE MOTOR

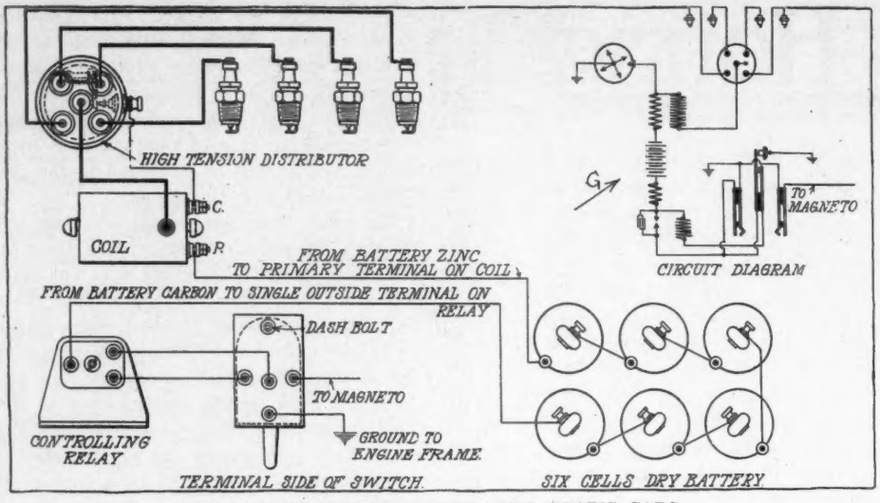


FIG. 3—DELCO SYSTEM FOR THIS YEAR'S CARS

more, a leading exponent of the two-cycle type. In this sectional view it will be seen that the inlet ports, H, are just opposite the exhaust ports, K. In this motor a distrubutor, B, is used closed by a valve, E, which gives the mixture entrance to the bypass, C. The relative positions of the pistons, P, in the four cylinders are also shown. The principle of operation of this motor was explained in the Readers' Clearing House for June 1, 1911.

RADIATOR RUNS DRY

Piper City, Ill.—Editor Motor Age—In the Readers' Clearing House will Motor Age answer the following questions:

1—I have a Reo 30, 1911 model, which heats very much. When I first got it it ran fine, but now if I go about 8 miles it boils dry. The ignition is all right, and it does not take much gasoline. A Stromberg carbureter and Splitdorf magneto are fitted. The pump throws a good stream, and the cylinders are clean. I have gone about 1,700 miles.

2—What is the exact horsepower of this car?

3—What is the horsepower rating of the Jackson 30 and Jackson 40?—S. P. Thurner.

1—You state that the cylinders are clean and that the water pump throws a good stream. This, of course, eliminates one of the most common causes of overheating, that is due to carbon deposits in the cylinders. Your trouble, therefore, may be due, either to an overrich mixture, to scored cylinders or the want of a fresh supply of lubricating oil; or, it is possible that the water circulation through the radiator is not what it should be. If you are using water in your radiator that contains minerals or alkalies, incrustations may have accumulated in the radiator that prevent the heat of the water from being properly radiated away. If these incrustations are suspected, consult with some local steam engineer and learn from him if he has experienced similar trouble with the flues of his steam boiler; and if so, what compound he uses to prevent or eliminate the scale or deposits. Different waters in different parts of the country cause various formations; and various different compounds are obtainable from any of the large engineers' supply houses to remove these formations.

The most generally accepted method, and the one that seems to give the best results in cleaning radiators, is to dissolve 2 pounds of common washing soda to each gallon of water needed in the cooling system. Pour this solution into the radiator, run the motor a few minutes, and allow it to stand over night. In the morning drain out the system, flush it out, and fill up with clean water. When the radiator is known to be thoroughly clean, the use of rain water will prevent the formation of incrustations. One always should remember to keep the spark as far advanced as possible without causing the knocking due to pre-ignition; and to see that the radiator is full of water before starting out for a run.

2—The horsepower of the Reo motor is 25.6, according to the S. A. E. formula, and 32 horsepower by dynamometer tests is claimed for it.

3—The Jackson 30 and 40 are rated at 30 and 40 horsepower respectively by the Jackson company; and according to the S. A. E. formula they would be rated 25.6 and 32.4 horsepower respectively.

THINKS WEAK MIXTURE CAUSE

Chicago—Editor Motor Age—I note a communication signed by Doc in Motor Age July 27, page 31. I think the trouble is due to too light a mixture instead of too heavy a mixture as you suggest. This trouble can be eliminated by slightly increasing the size of the hole in the nozzle of the carbureter. This is assuming that Doc has no heavy carbon as a deposit, that the fan belt is tight and the radiator filled.

It is not necessary to remove the cylinders in order to clean out the carbon. A simple method is by using soft wire chain which can be inserted in the cylinders through the exhaust ports and by running the motor with two clinders he can remove the carbon from the remaining two. In the event that the motor is heavily carbonized ready access can be had by taking off the top waterjacket plate and removing the large plug which is in the top of the cylinder. It is quite unnecessary the cylinder.—C. E. D.

DRY CELLS VS. MAGNETOS

Dayton, Wash. — Editor Motor Age — I saw a letter in the Readers' Clearing House columns of issue of July 27, and signed A. D. Carpenter under the caption, "Prefers Battery to Magneto," which strikes me about right. What he has to say about the little dry cell or the accumulator is also correct. I have been driving cars since 1902, and have found a way to get good satisfaction from batteries, and always know just what I have in reserve. I use a Hoyt voltmeter on my dash, with the voltmeter permanently connected in series with the battery, and the ammeter across the coils. When the switch is thrown off, of course, the instrument is also cut out of circuit and does not register, but when the switch is on, the voltmeter instantly registers the condition of the batteries and tells whether the connections are correct among the cells themselves and to the coils. The ammeter does not come into action until a contact is made at the timer, when it shows how much current is being used up by that coil and may be used to adjust the vibrater. I use the Pittsfield coil which should be adjusted to take .75 ampere on short circuit, and consumes only about .4 when the engine is running.

The ammeter should be used to adjust each coil separately, so that each one takes the same amount. This can be done by turning the engine over by hand, noting the working of the vibrators and tightening or loosening them in order to get the same current consumption for each coil. This makes a sure way to adjust the coils and insures a smooth working engine with the least amount of current consumption and is easier on the contacts. As a matter of course the contacts must be kept smooth and even at all times. I also find that with two sets of six cells in series, and these sets worked in parallel, which on my switch is done by merely setting the switch handle in the notch between the contacts for the two sets, gives me much more mileage for the twelve cells than I could possibly get by using one set at a time. I get about one-third more mileage in parallel than by using each set alone. It is easily seen why this is true, when we come to consider that the more current you draw from a given source in any stated time, the shorter time will that source remain good. With the cells in series I draw all current used from six cells, whereas with two sets in parallel I draw half of the same amount from each set. This increases the time the cells will last by about one-third.

The magneto is a fine instrument and

gives good satisfaction while in perfect working order, but if it gives out at all you are left in the lurch completely, whereas with batteries you can carry a dozen fresh cells with you all the time if necessary. This I never have found it necessary to do. ; To carry a fresh magneto is troublesome and quite expensive, and is not practicable. The cells do not cost much and can be obtained almost anywhere, whereas to repair a magneto is not always easy.

If one wishes to use a storage battery he can do so, and the voltmeter acts just the same with it as it does with the dry cells. The only trouble I have ever had with systems has been the wearing off of the insulation on my wiring to the timer, because of the motion at that particular place. This is always shown as soon as it occurs, for one vibrator will buzz all the time that this worn part comes in contact with any part of the engine. It will show also by irregular action of the ammeter needle. Again if there is a short circuit in the secondary wiring the needle of the ammeter will dodge about considerably. With this arrangement on my car I consider that I have a more satisfactory and cheaper installation than I would have with a good magneto. Again, I wish to call attention to a fallacy usually employed by the salesman to prove that a magneto gives more power than does the batteries and coils. It must be conceded that the time elapsing between the making of the contact at the timer and the actual spark in the engine cylinder is greater with coils than with a magneto. This accounts for the fact that with an engine fitted with both systems, it appears to pick up slightly on switching from the batteries to the magneto. It is the same thing as advancing the time of the spark slightly, and any one knows what that will do.

I believe that taking into account the expense of a good magneto and counting interest on the investment, the batteries are cheaper on any small car. Although it does take a little special knowledge to use batteries economically and with satisfaction, yet it does not take nearly so much as it does to keep a magneto in order. The latter needs the services of an expert at all times if it is to be kept in perfect working order, and although it does seem to be giving pretty fair satisfaction even in the hands of novices for the first season, yet there comes a time when the magneto, like all mechanical appliances, must be overhauled and readjusted and even the average mechanic of the repair shops more often fails than succeeds in getting the adjustments just right. The so-called dual system, where dry cells or a storage battery is used to fire the engine through the distributing parts of the magneto have one serious drawback, and that is that both systems use the weakest mechanism, the distributer of the secondary current, and if any part of the magneto breaks down it is almost sure to be this part, which always puts both systems out of commission.

The double system is even more expensive than either of the others, because it requires a full set of appliances for both the battery and magneto systems. I hope that no one will consider that I am trying to belittle the magneto, for that is far from my intention. My purpose is only to call attention of the battery users to the easiest way of getting rid of two-thirds of their electric troubles, and make them better satisfied with that which they have. The voltmeter gives the driver knowledge of the condition of his batteries and all connections at all times, and points to the probable cause of derangement at once, thus assisting him to remedy it in a few moments instead of trying out one theory after another until he is disgusted.—E. H. Van Patten.

SHOULD BE REVARNISHED

Frankfort, Ind. — Editor Motor Age — Through the Readers' Clearing House will Motor Age answer the following questions:

1. I bought a new touring car this season and in driving the car home from the factory I encountered a heavy rain. As a result the hood and fenders are dull and do not shine like the body of the car. Does Motor Age know of a good body polish or recipe that would shine them up?

2. Can a dynamo be installed on any make of car for the purpose of running headlights? If so, who makes such a dynamo?—Max Fowler.

1. Motor Age does not know of any body polish that will bring back the gloss to your fenders. Undoubtedly you took your car from the factory before the paint and varnish had become set, or properly hardened; and then allowed the rain water to dry off on the fenders. Your error is rather a common one for it has happened very often before. Practically the only way to bring back the shine on the fenders, would be to have them rubbed and revarnished. When a car has been newly painted, it should be washed only with cool, clear water and then dried off immediately with a chamois; the use of warm water and some of the strong soaps is to be avoided for at least 2 months, and even then when soap is used, it should be in the form of a suds and washed off again with clean water at once.

2. There are several makers of motor car lighting systems having dynamos as a primary source of current, and their names and addresses may be obtained from the advertising columns.

EN BLOC CASTING FOR SIXES

Dover, Minn. — Editor Motor Age — I would like to know what Motor Age thinks of a six-cylinder motor cast en bloc. If one cylinder would freeze would a new motor be necessary?—H. B.

If you mean, should the water in the jackets freeze, a new motor would not be required unless a suitable repair or weld could not be made. If you mean, should a piston become stuck in one of the cylinders owing to a lack of proper lubrication, the answer would be: Not necessarily; pistons have been known to expand from the heat, and freeze, so to speak, or become stuck fast in the cylinder without damaging the cylinder walls. Should the walls be scored or scratched, however, either the cylinders would have to be reground and new pistons fitted, or a new cylinder casting obtained from the factory or nearest branch.

Motor lubrication, construction and design are now developed to such an extent that acidents of this nature are very rare, and are hardly to be reckoned with in the choice of a motor. When the four-cylinder en bloc motor was brought out there were many protests against such construction, but thousands of four-cylinder en bloc motors now are in use and have been for 2 or 3 years, with the result that they have given such excellent service that now even six-cylinder motors with all the cylinders cast in one piece are being made with very satisfactory results in every respect.

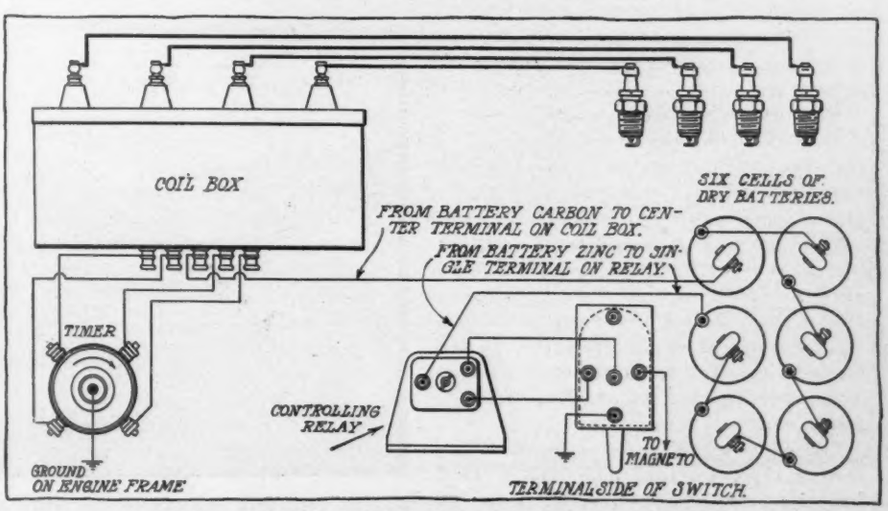

COIL BOX
SIX CELLS OF DRY BATTERIES.
FROM BATTERY CARBON TO CENTER TERMINAL ON COIL BOX.
FROM BATTERY ZINC TO SINGLE TERMINAL ON RELAY.
TIMER
CONTROLLING RELAY
TO MAGNETO
GROUND ON ENGINE FRAME
TERMINAL SIDE OF SWITCH.

FIG. 4—CIRCUIT OF 1910 DELCO IGNITION SYSTEM

Two Corbin Types—30 and 40 Chassis

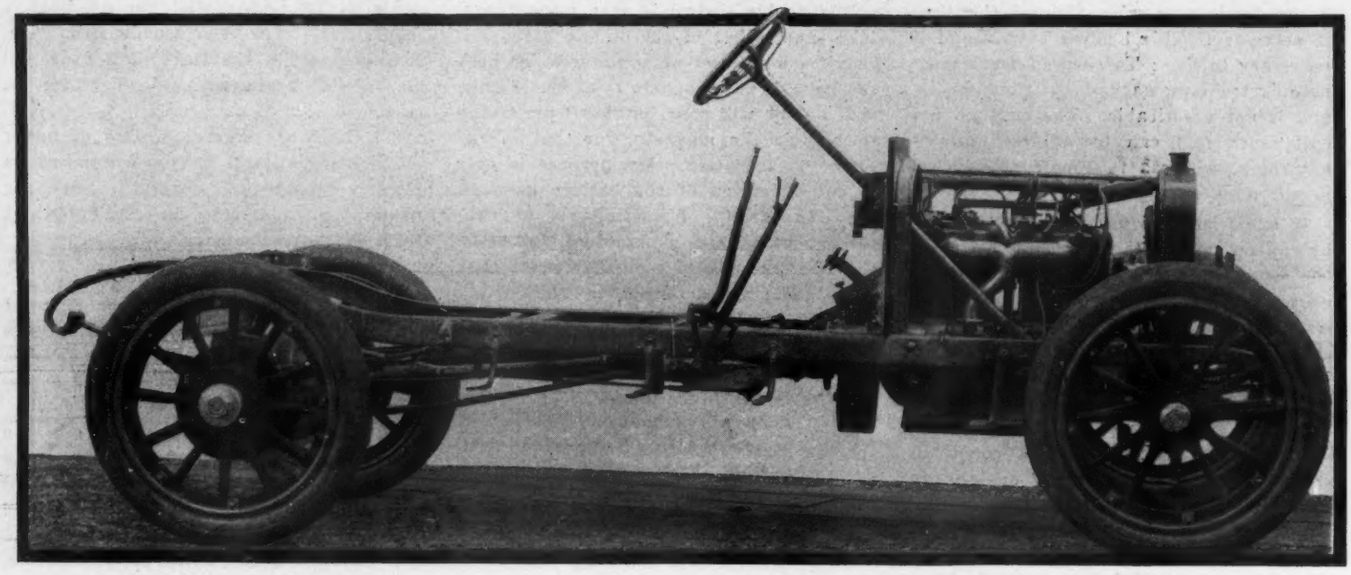


FIG. 1—CORBIN 1912 MODEL 40 CHASSIS, MAY BE FITTED WITH TOURING TOY TONNEAU, LIMOUSINE OR TORPEDO BODIES

THE Corbin cars for the approaching season will be made in two models, a 30 and a 40. Both are continuations of this year's models with but few changes seen. This year the Corbin Corporation has built three models, namely, 18, 30 and 40, but the 18 has been discontinued for the 1912 market. Of the two models 30 and 40 the former is a good example of that type of car which has been changed little since it was first placed upon the market. To explain: The gearset at present used in it was designed for the 1906 season, and has been used without change ever since, and will be continued in its present form for the next year. The rear axle was brought out for the 1907 season and has not undergone an alteration since, or will it for next year. The motor was first built for the 1908 models, and has been continued without alteration since. Last but not least, the steering gear and many other parts have not been altered since first brought out. This in itself is a good recommendation for this model, as lack of change shows that the makers are satisfied with the design.

Compared with model 30 the model 40 is a new type, having been brought out for the 1911 trade. It will be altered but very slightly for next year. Model 40 is radically different from the 30. It has a different size and design of motor, the rear axle is entirely different, and there are many differences in the chassis parts. It can truly be said of the Corbin 40 that it is a different design from the 30 and must be looked upon as not only a larger model than the 30, but an altogether different one.

The 40 motor is a four-cylinder, twin-casting type, 4.75-inch bore and 5.5-inch stroke. This is a stroke-bore ratio of 1.15 to 1; that is, the stroke is approximately one-seventh longer than the bore. Figs. 3 and 4 show the constructive details. Like the majority of twin-casting motors it uses a three-bearing crankshaft. But the bearings are of adequate length, the front and center bushings measuring 3.5 inches each and the rear one 4.5 inches in length. The crankshaft is an alloy steel forging offset from the center of the cylinders 1 inch, in order to reduce the angularity of the connecting rods on the explosion stroke. By reducing the angularity of these rods on this stroke, the side thrust of the piston on the cylinder wall is reduced and the tendency is also to prevent the usual side slip of the piston as much as possible.

This motor is conventional in nearly all respects. The valves are mounted oppositely and are of good size, measuring 2.5 inches in diameter. They are of nickel steel. The pistons are made long, measuring 6.26 inches, and each piston carries four eccentric rings .25 inch wide and made with a diagonally split slot. The crankcase is made in upper and lower halves, the upper with four integral aluminum arms for four-point support direct on the main frame of the chassis. The lower half of the case contains the oil pump or reservoir for the circulating oiling system.

Fig. 3 illustrates the camshaft, made $1\frac{5}{8}$ inch in diameter and carried on three bronze bearings, the front one 3.25 inches long, the center one 2.25 and the rear one 2.5 inches long respectively. The upper ends of the connecting rods clamp to the wrist pins and the lower ends have Parsons white brass bushings 3.5 inches long. All motor bearings are finished by grinding. The two camshafts and the bearings can be removed as a unit from the crankcase, the whole assembly coming out through the front end. Wrist pins are of alloy steel, 1.25 inch in diameter, are hard-

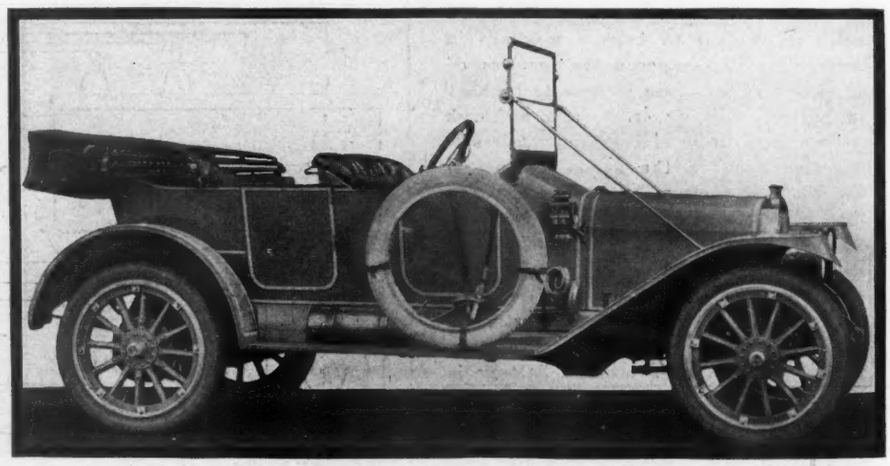


FIG. 2—THE 1912 CORBIN 40 TORPEDO BODY, WITH RIGHT-HAND CONTROL AND HEAVILY HOODED DASH

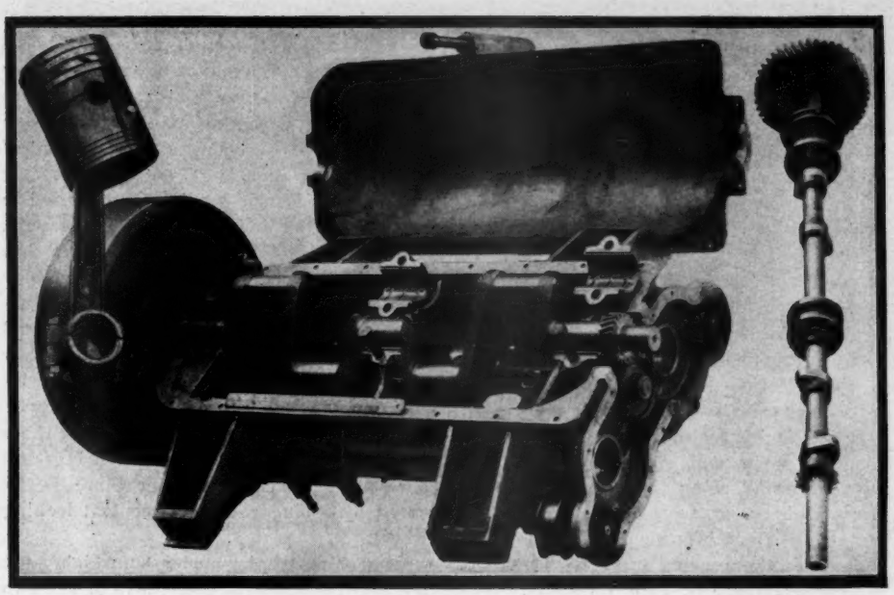


FIG. 3—ASSEMBLY OF CORBIN 40 MOTOR SHOWING THREE-BEARING CRANKSHAFT. UNIT ASSEMBLY OF CAMSHAFT WITH ITS THREE BEARINGS, AND SPIRAL METAL TIMING GEARS

ened and ground and oscillate in the piston bosses.

The cooling system has been well designed, and every detail for efficiency in absorbing surplus heat is cared for. The waterjacket spaces are large and the passages through the pipes and the radiator have been proportioned with regard to positive and brisk circulation. The circulation is by a gear pump, driven directly from the fan driving gear by a shaft and Oldham coupling. The cool water from the bottom of the honeycomb radiator is conducted to the water spaces surrounding the exhaust valve cages, as this is one of the hottest places in the cylinder. It then passes around all other parts of the cylinder, equalizing the temperature, and is discharged to the upper portion of the radiator.

The water manifolds are well proportioned as well. At the rear portion of the upper pipe the bore is 1.125 inch, as but one waterjacket is discharged through it, but at the front end, where the contents of the two waterjackets are passing through, the bore is increased to 1.5 inches, to compensate for the increased flow of water. Similarly, the pipe from the pump is larger in diameter than the branch member. The manifolds are brazed construction of copper pipe, and all joints are either ground unions or well packed flange connections. The pumpshaft bearing, which carries the stuffing box at the outer end, is 4 inches long. The cooling fan, which has six blades, is mounted on a sliding bracket, by which the tension of the 1-inch wide endless flat driving belt can be maintained uniform at all times.

A non-splash oiling system is used. The four connecting rods do not dip into a bath of oil in the bottom of the crankcase. The oiling system is the constant circulation type, as the lubricant is kept in motion by a gear pump driven by bevel gears on the exhaust camshaft. A conduit is cored in the side wall of the upper crankcase, this supplying the main bearings. The surplus oil reaches the crankpin through passages in the shaft and the spray of oil thrown over the rapidly revolving crankshaft lubricates the cylinders and other internal parts thoroughly. Excess oil drains to the bottom of the engine base, flowing directly into the pump or oil reservoir, no lubricant remaining in the case for the connecting rods to dip in as in conventional practice.

The Corbin ignition system has been characteristic for many years, the company maintaining its fixed policy during the many recent innovations in the ignition field. The 40 has two systems. One is a U and H high-tension magneto and the other is made up of a battery, a single-unit coil and a combined Connecticut timer and distributor. Fig. 4 shows the relative positions of the two essentials, the magneto mounted on the right front motor arm, its drive being through a separate shaft with coupling. The timer-dis-

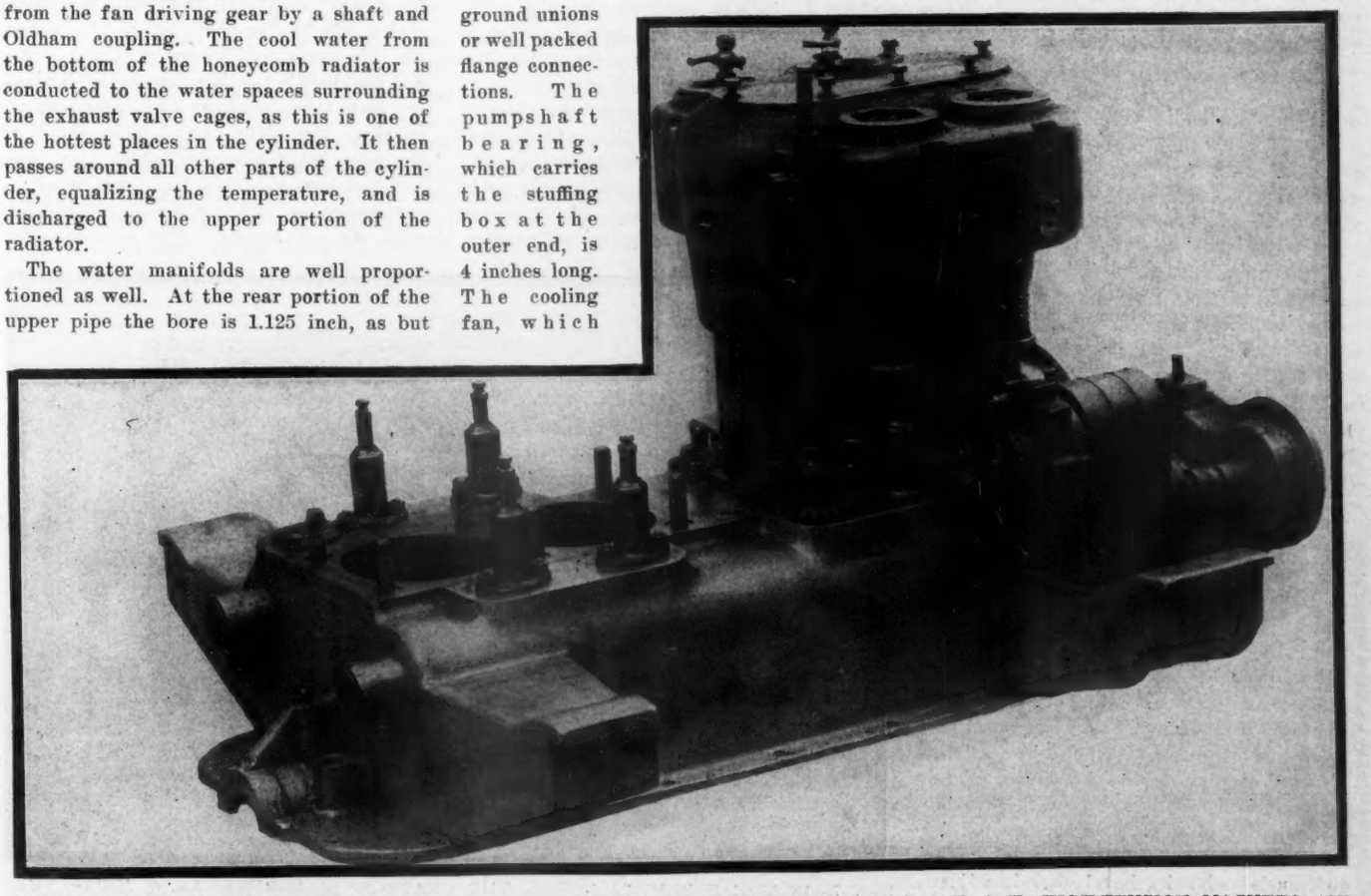


FIG. 4—ON THE CORBIN 40 MOTOR, TWO IGNITION SYSTEMS ARE FITTED, ONE BEING A U. & H. HIGH-TENSION MAGNETO AND THE OTHER A BATTERY SET INCLUDING A SINGLE-UNIT COIL AND COMBINED TIMER-DISTRIBUTOR

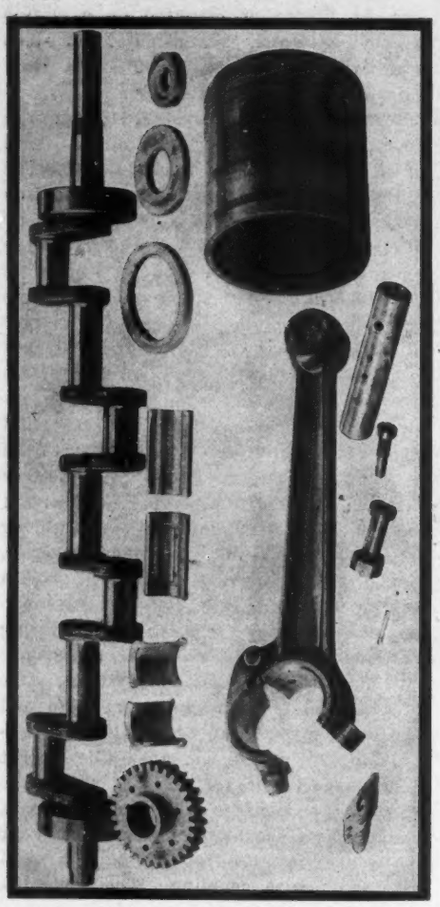


FIG. 5—MODEL 30 CORBIN CRANKSHAFT CARRIED ON BALL BEARINGS AT EACH END, AND THREE CENTRAL BEARINGS; THE CONNECTING RODS HAVE HINGED CAPS TO MAKE ADJUSTMENT VERY EASY

tributer is supported on the top of a vertical shaft between the cylinder castings and is driven from the camshaft. A bracket on the front cylinder casting supports the vertical shaft.

On the model 40 and also on the 30 the use is made of a cone clutch carried in the flywheel. Closely connected with the clutch is the three-speed selective gearset, which is practically alike, so far as design is concerned, in both models. The set is of the horizontal design, in that the secondary shaft is to the side of the mainshaft. Both shafts are carried on ball bearings.

Rear Axle of 40

The housing of the model 40 rear axle is a steel stamping of diamond shape into which the differential bolts. Into the ends of this stamping are secured the tubings forming the axle sleeves. Specially heavy webbing in conjunction with the differential is used so that truss rods are not needed. The differential gear with the pinion constitutes one unit in assembly, being supported and fixed to a casting which bolts into a large circular opening in the front face of the axle housing. At the rear of the housing is a similar circular opening, covered by a plate for inspection purposes only. The differential with its bevel gear is adjustable with reference to the pinion and the pinion is also adjustable by locking collar in front of the pinion bearing. This double adjustment insures proper meshing of the bevel and pinion and should give a quiet axle. The propeller shaft, connecting between the gearbox and differential, has two universal joints and torque is absorbed by a V-form torsion bar, carried at its forward end in a swinging support between upper and lower springs; and at its rear end it spans the differential housing and here provision is made for a hinge movement to the right and left.

The brake equipment is internal and external on rear wheel drums. The foot brake is the external set. The expanding set for emergencies is controlled by side lever. Steering is by a worm and full gear, instead of worm and sector. Using a full gear allows of using the four quarters of the periphery, or toothed surface, should any one of them become worn. This gives four times the wearing surface. This gear is forged integrally with its shaft. The end of the shaft is made with a square taper so as to always make a fit in the squared hole in the radius arm hub.

The Corbin 30

The radical differences of the Corbin model 30, as compared with the model 40, are seen in Figs. 7 and 10. The motor and gearset constitute a unit, in that the base of the crankcase, Fig 7, is continued to the rear, forming a covering or sheath for the under side of the flywheel, and to this is bolted the front end of the gearbox. A unique method of supporting the two is adopted. It is a metal pan support. The crankcase and gearbox casting are made without supporting arms of any kind, but as Fig. 10 shows, they rest at each end on a frame crossmember and at the sides in a steel supporting pan, which extends from one side member of the frame to the other and also from the front cross members to the central cross member. This is a very satisfactory form of support and has been used since the adoption of this motor. It is rigid and yet enough flexibility is secured to free the motor from the heavy frame strains. This form of support makes it necessary to support the motor through the lower part of the crankcase, instead of through the upper part, and consequently the five crankshaft bearings are carried in the lower part and not in the upper part. This would naturally suggest the fact that it would be difficult to take up the lower connecting rod bearings, as the crankcase cannot be dropped to do this. Instead of having to drop the case, or the lower part of it, two very large rectangular inspection plates are used on the right side of the case, and through each of these openings two connecting rod bearings are accessible. Each inspection plate is secured by a long yoke with central locking wheel.

One point of the model 30 which must not be overlooked in these days of the two and three-bearings crankshafts is the use of a five-bearing shaft. Many makers, who at one time used a five-bearing shaft when cylinders were cast separately, dropped to the three-bearing shaft when the cylinders were cast in pairs, but within the last year or 2 it has become customary with some of the leading makers to return to the five bearings and also use the twin-cast cylinder. This is possible by fitting a shorter bearing between the two cylinders in each twin casting. The reason for the return to five bearings is to get a more rigid shaft and to do away with whipping, which affects the running of the motor. On this motor, as illustrated in Fig. 5, the end crankshaft bearings are F and S annular ball type, whereas the three central bearings are plain ones. This is one of the very few motors in which plain and ball bearings are used on a crankshaft.

Lubrication is by a special pump system, the oil supply being carried in a

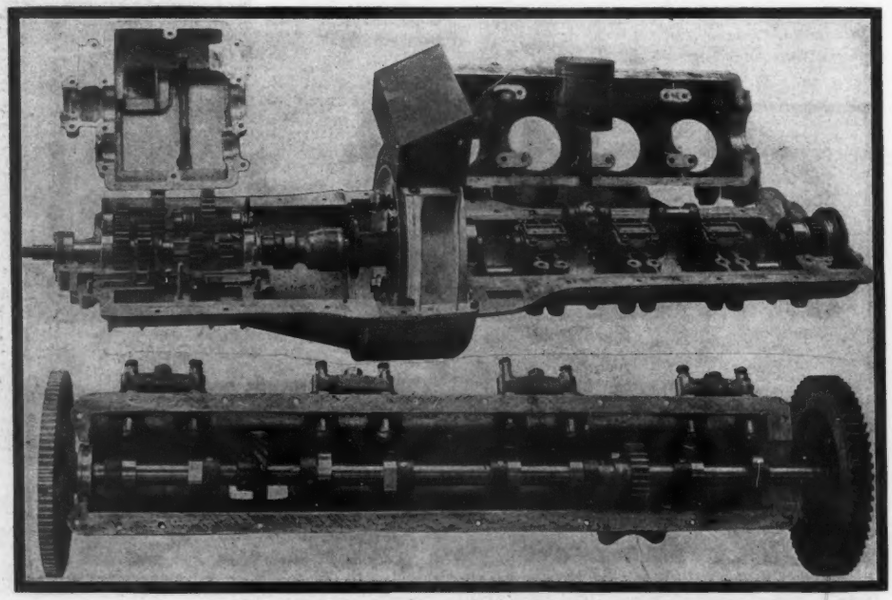


FIG. 7—IN THE CORBIN 30 MOTOR, THE GEARBOX IS FORMED AS A UNIT; THE CRANKSHAFT BEARINGS ARE CARRIED IN THE LOWER HALF OF THE CRANKCASE AND THE CAMSHAFT IS MOUNTED IN A DETACHABLE HOUSING

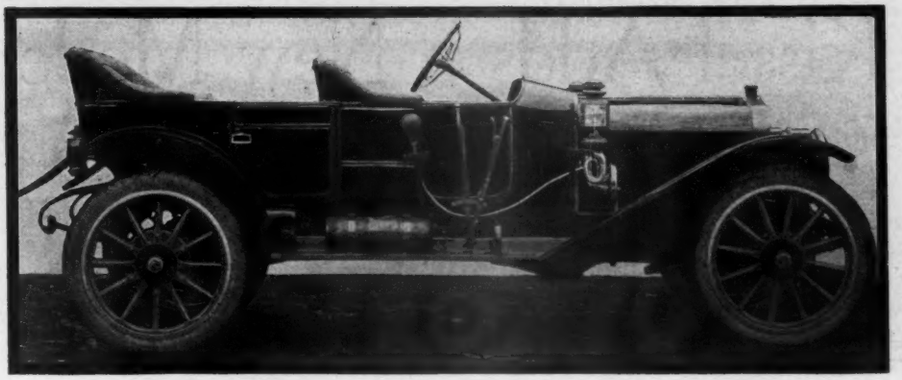


FIG. 6—CORBIN MODEL 30, FIVE-PASSENGER TOURING CAR FOR 1912

tank, Fig. 7, above the flywheel. A sliding-valve pump draws on this supply and forces the oil through one lead that branches to the four cylinders. The other leads connect with the crankcase splash wells. This is a splash system as compared with the non-splash system used in the 40 motor.

Ignition is the same as in the 40, so is the carburetion. The water circulation system is standard.

The cylinders are individual castings, with waterjackets integral and are 4.5-inch bore and 4.25-inch stroke. They are "L" type, the valves being placed side by side and operated from a common shaft. The valve lifters are in bronze guides, which can be easily removed, as they are attached to the camshaft housing by double stirrup fittings, held in place by one bolt. The valves are of nickel steel, head and stem being formed intergrally. The valve springs instead of being the conventional form are coned at the lower ends and deliver their pressure against a large split pin passed through the valve stem, no collars or keys being employed. The raising effort of the cam is not taken directly by the plunger, as in conventional practice, but upon the lower end of the lever interposed between it and the cam. This is to avoid side thrust on the valve lifters and so give a quieter operation. The plungers are fitted with hardened set screws having check nut retention so that the clearance between them and the valve stems may be accurately maintained.

The entire camshaft assembly, Fig. 7, lower part, is housed in a separate case which forms a unit that can be separately assembled and applied to the side of the motor base. This is an important structual advantage. The pistons have four rings and two oil grooves. Each wristpin is a hollow piece of special steel with hardened surface. It is machined on a slight taper and formed in the piston bosses, where it is retained by a set screw with a pin at the end projecting in the interior.

The connecting rods are forgings of special steel and have hinged lower caps, affording adjustment by tightening one bolt. They are light and strong and of the conventional "I" section.

The clutch and gearset employed are of the same design as on the model 40; but a semi-floating rear axle is used.

The running gear has semi-elliptic springs in front and three-quarter elliptics in rear. Tire sizes are 34 by 4 inches. The wheelbase measures 115 inches. This chassis carries touring car and roadster bodies.

NEW PACKARD TRUCK

In announcing a 1½-ton truck as an addition to its line, the Packard Motor Car Co. of Detroit is responding to a demand for a motor vehicle that is lighter and faster than the Packard 3-ton truck. The speed of the new vehicle is about 15 miles an hour on solid tires and 17 miles an hour on pneumatic tires. The normal load is 3,000 pounds. The motor and clutch are so mounted that by removing the radiator and front bumper and detaching the intervening connections, the complete unit power plant may be taken out from the front without hoisting. Both foot and hand brake shoes are easily removable for the purpose of replacement. Ample provision is made for the convenient lubrication of all working parts, including spring bolts. The chassis is furnished in two lengths of wheelbase, the standard 10 feet and the long 12 feet.

There are four cylinders cast in pairs; bore 4 1/8 inches; stroke, 5⅛ inches. The motor, which is 26.4 horsepower S. A. E. rating, is out in front under a hood, where it is given the greatest possible accessibility. The lubrication is by splash. A sealed automatic governor limits the speed to prevent excessive wear and tear. A secondary throttle for regulation of speed within the limits of the automatic throttle is controlled by a hand lever on the steering wheel and by a foot accelerator pedal.

The Packard dry-plate clutch is encased in a rearward integral extension of the crankcase. The speed change is by sliding gear transmission, three forward speeds and reverse. The final drive is by sprockets and chains to rear wheels. The main frame is channel section rolled steel. The springs are semi-elliptic, 42 inches long in front, 46 inches long in rear. An external contracting foot brake acts upon drums on the ends of the countershaft. Internal expanding hand brakes act on drums on the rear wheels.

MOTOR CAR LITERATURE

"Lubrication of the Motor Car," by H. R. Pickering, is a dissertation on the subject of lubrication issued in the interest of the New York and New Jersey Lubricant Co., New York. The booklet covers various problems pertinent to the subject. In addition there is inserted a chart showing every part of the car which requires lubrication, with a key table.

The Perkins Campbell Co., Cincinnati, Ohio, have issued a conventional catalog featuring its line of straps and leather accessories for motor cars. It has also issued a 1912 catalog of other accessories as license holders, tire irons, jacks, etc.

The B. F. Goodrich Co., Akron, Ohio, has issued a set of route books, the outcome of its road-marking tours. The books are 5 by 9½ inches, and cover the following routes: Cleveland, Ohio, to New York City via Buffalo and Albany; also routes from New York and Philadelphia to Atlantic City and Lakewood, N. J. The maps used in these books are those furnished by the Automobile Blue Book.

A year book and tour book combined comes from the National Automobile Association, Boston. There are forty-seven tours outlined, varying in length from 1 to 12 days, with map illustrations; besides these there are five state maps, with seventeen maps through the various sections of New England. A digest of the motor vehicle laws in the states and Canada, a list of the attorneys for the association, list of garages, etc., is included.

The Merchants and Evans Co., New York, is mailing a circular featuring its line of tire and tool cases, joints, clutches, etc.

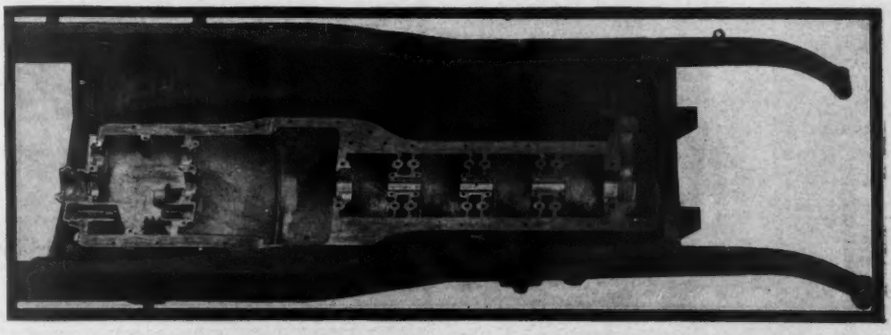


FIG. 10—CORBIN 30 BASE PART OF MOTOR AND GEARBOX, SUPPORTED IN FRONT AND REAR ON FRAME CROSS MEMBERS AND SUPPORTED MIDWAY BY STEEL PLATES BETWEEN THE FRAME AND THE CRANKCASE OF THE MOTOR

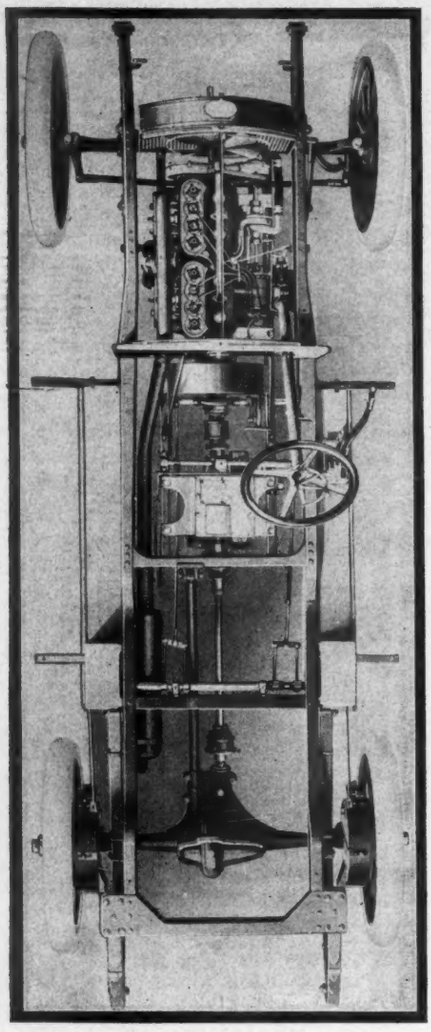


Fig. 1—The Typical Kissel Chassis

This is the typical Kissel chassis used in all four of the 1912 models. The frame has been narrowed at the dash and is made with the double drop in the side members. Both the motor and gearset are as before carried on subframe members. An improvement is the adoption of a Mercedes type of radiator in place of the vertical tube design. Both sets of rear wheel brakes are applied through equalizers. Although fore-door bodies are used, the change speed and emergency brake levers are placed outside of the body on the right side. The wheelbase measurements have not been increased over the present type. Larger tires are used on two models. A new model is the 40, which added to the three used this season gives a complete line for the approaching season. On the three largest models demountable rims and shock absorbers are stock equipment. The rear axles on all models are heavier. Dual ignition is uniform on all four of the models and the Stromberg carbureter is standard throughout. A motor improvement is the equipping of covers for the valve springs. The leather-faced cone clutch is continued. Rear springs are three-quarter elliptics. A heavy rear cross member on the frame is used for attachment of these springs. Each model is sold completely equipped and ready for the road.

Kissel Adds a New Model

Model 40 Now Gives Complete Range of Models 30 40, 50 and 60

Fore-Door Bodies and Heavier Rear Axles

THE Kissel Motor Car Co. has enlarged its line of cars for 1912. This year it had three models and next year it will have four. The new model introduced is listed as a 40-horsepower chassis, so that for next season the company will have what it designates a 30, a 40, a 50 and a 60, the first three having four-cylinder motors and the fourth is a six-cylinder design.

All four of these Kissel chassis are alike in general design: They use the same style of L-type motor with the cylinders cast in pairs; these motors all have a Stromberg carbureter; they all use Mea or Bosch dual ignition systems; they are all made with the same type of circulating oiling system; all of them use their leather-faced cone clutch; the 30 and 40 use a three-speed selective gearset; and the 50 and 60 a four-speed selective set with direct drive on third; all cars are fitted with floating rear axles; internal and external brakes operate on rear wheel drums; the side members of all frames are narrowed or bottle-necked at the dash—this is new, not having been employed on any of the models before—and all frame side members have the double drop the same as in 1911. In a word, this is the general make-up of the Kissel 1912 line.

Improvement in New Models

There are some improvements which have been carried through all models. In this respect bodies come first: Fore-door bodies are regular equipment on all chassis types, whether touring car, semi-touring or semi-racer. On all the models the straight line type of body is used, with a hooded dash on the semi-touring and semi-racing bodies. The semi-racing body is an elaboration of the baby tonneau, and an adaptation of the touring car. All bodies are fitted with ventilators. With the exception of the 30 chassis, demountable rims and shock absorbers are stock—that is, on the models 40, 50 and 60; this is an important factor in car equipment and is one that is receiving much attention at the hands of different makers for the coming season.

An important element in which Kissel line for 1912 differs from the 1911 output is that all cars are sold with complete equipment. On the 30, this includes top, gas lamps, gas tank, dash and tail lamp, horn, jack, pump and kit of tools for tire repairs. On the 40 a glass front is added to the equipment already mentioned as well as speedometer and demountable rims and shock absorbers. On the 50 and 60 the equipment is practically the same as on the 40 except that a speedometer combined with a clock is fitted.

A cursory glance at the Kissel chassis, Fig. 1, shows its general layout. The motor and gearset are carried on subframe members, the gearset being practically amidship. Transfer of power from the gearset to the rear axle is by a propeller-shaft with two Spicer universal joints, one

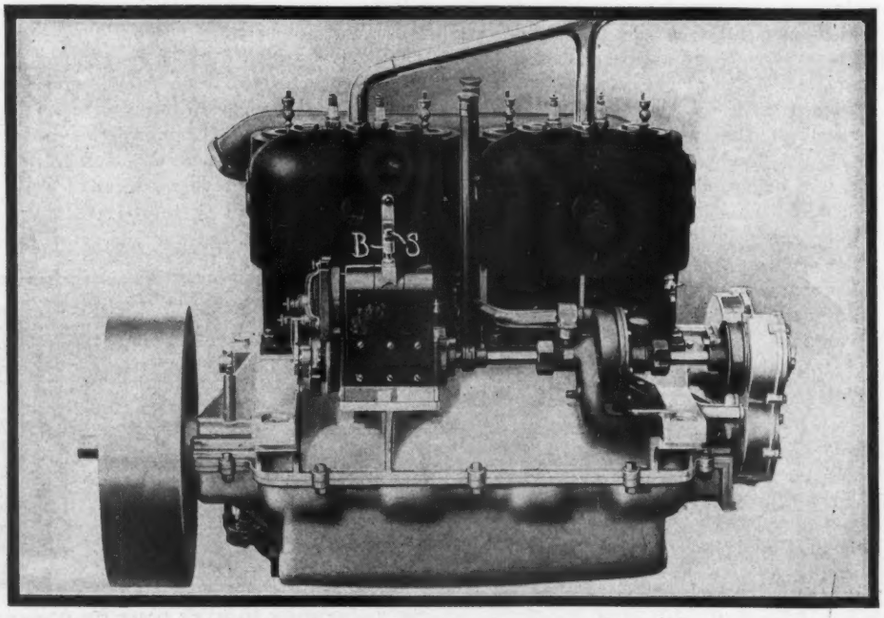


Fig. 2—Magneto Side of Kissel Motor, A Mea or Bosch Dual Ignition System Is Introduced—Note the New Method of Magneto Fastening

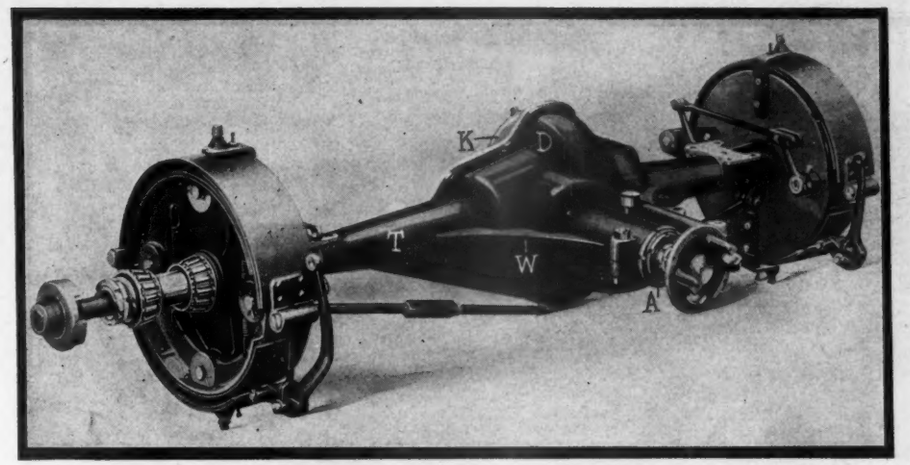


Fig. 3—On the Kissel Cars the New Floating Rear Axle Has Tapered Axle Tubes T, the Axle Drive Shafts Are Heavier and a Bevel Gear Differential Is Used Where a Spur Gear Type of Differential was Employed During the Present Season on All Three of Its Models

at the front and the other at the rear. To the left of this shaft is the torsion tube, supported at its forward and between upper and lower springs. Steering control is on the right and the emergency and change speed levers are both placed outside of the fore-door body. The spring equipment is semi-elliptic in the front and three-quarter in the rear.

Motors Made by Kissel

Figs. 2 and 5 show the general features of the four and six-cylinder motors, both of which are alike in the majority of details. An important change made is that the exhaust and intake valve springs are entirely inclosed by plates, Fig. 5. This results in the reduction of noise to a considerable extent as well as giving a cleaner appearing motor. These motors are made entirely in the Kissel factory. The crankcase is a two-part aluminum casting, the upper half carrying the three crankshaft bearings used on the four-cylinder car and the four bearings used on the six. The upper half of the case has four integral arms furnishing a four-point support. The finishing work on all of the motor parts is carefully looked after. Cylinders, wrist pins, crankshaft bearings, etc., are ground to size; and after the cylinders have been given the grinding process they are lapped by a specially designed lapping machine. In this lapping process each piston is lapped in its respective cylinder and each ring in its respective groove. The usual way in balancing pistons, connecting rods and wristpins is made use of.

When a matter of lubrication is concerned it is found that the circulating system of oiling employed this year is continued. Fig. 5 shows the circulating gear pump OP located at the left rear of the crankcase and driven through a vertical shaft from the rear end of the camshaft. This oil pump draws its supply from a sump, or separate compartment, in the lower part of the case, and forces the oil through a pipe carried in the upper half of the case. This pipe has four outlets, one opposite each connecting rod lower end, so that the oil is forced direct onto them. A splash level is maintained beneath each connecting rod which cares for the crankshaft bearings, camshaft bearings, wrist-pin bearings, cylinder walls and piston rings. When the splash level exceeds a predetermined height, it overflows and returns to the oil pump reservoir, where it is passed through wire mesh to remove metal particles, whence it is ready for recirculation. At the left front of the motor is a handle D, which permits of opening drain cocks in the base of the case, thereby obviating the necessity of having to reach under the motor to do this.

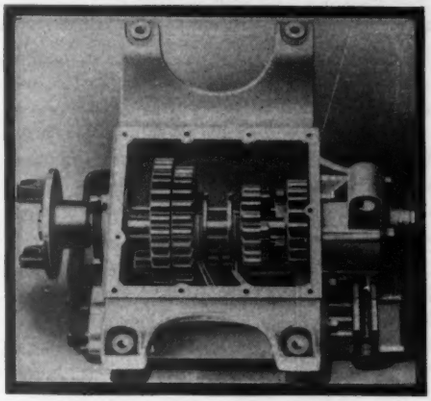


Fig. 4—The Kissel Gearset on Models 30 and 40 Gives Three Forward Speeds and on Models 50 and 60 Gives Four Forward Changes With Direct Drive on the Third Speed. The Shafts Are Carried on F. & S. Annular Ball Bearings and Chrome Vanadium Steel Is Used for Both Gears and Shafts. Direct Drive Is Obtained by the Use of Dental Face Teeth on the Opposing Faces of the Front Sliding Gear and the Master Pinion. In All Four Models Use Is Made of an Aluminum Gearbox Which Is Carried at Four Points on the Channel Section Subframe Members at the Middle Point of the Chassis

The Dual Ignition System Used

The installment of the Mea or Bosch dual system on all models is new. The magneto is most accessibly mounted on a continuation of the pump shaft on the right side. The novel scheme is adopted for holding it in place. It is secured by means of a set screw S, which carries a concave plate resting over the top of the center magnet. The screw S passes through a bracket B on the cylinder; and by raising the screw it is possible to slide the magneto out of position.

The floating design of Kissel rear axle is illustrated in Fig. 3. This axle on all models is heavier than this year—that is, the housing design is stouter and the driveshafts between the differential and the rear wheels are also heavier. The axle tubes T are now tapered from the differential housing D outward. Extra strength is obtained by means of the webbing or reinforcing W. Instead of the spur gear differential of this year a bevel gear type is used. This differential is carried on Timken roller bearings and means are furnished by means of the adjusting ring A, whereby the bevel pinion can be moved into adjustment with the differential bevel; and means are also

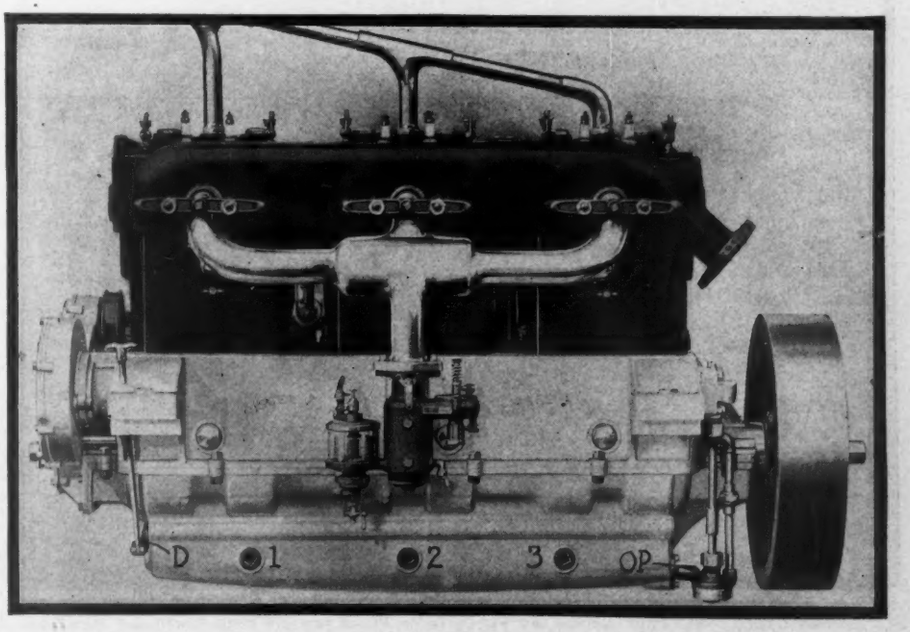


Fig. 5—The Valve Side of the Kissel Six-Cylinder Motor, Showing Valve Spring Covers in Place and Stromberg Carbureter Fitted on All Models—OP Is the Circulating Oil Pump

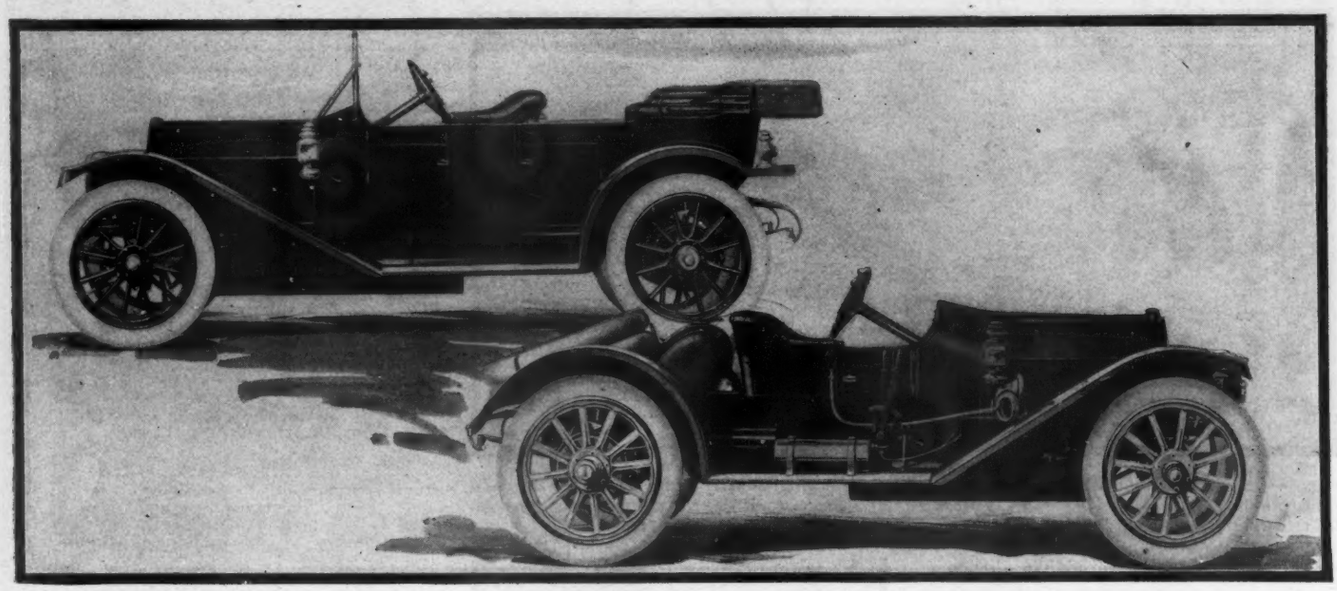


Fig. 6—The Semi-Touring Kisselkar Is Shown in the Upper Left and the Model 30 Semi-Racer in the Right

furnished whereby the differential unit can be moved to the right or left for a proper mesh with the pinion. This should insure a quiet rear axle.

In this illustration is shown the general scheme of using internal and external brakes. On all models the brake drums are 14 inches in diameter and of liberal width. On the external set provision is made to prevent dragging and springs are used to insure ready disengagement of the expanding shoes on the internal brakes. The operation of both sets is through equalizers.

In Fig. 4 is shown the standard design of Kissel gearset. In this the gears and shafts are of chrome vanadium steel and F. & S. annular ball bearings are used throughout. The illustration is of a four-speed set, which gives direct drive on third, through dental-faced clutch teeth. The sliding bars for shifting the gears are carried within the case on the right side. The usual precautions to prevent leakage of oil have been looked after.

In the Kissel running gear use has been made of the double drop frame through this entire season, and it has been continued without alteration for next year. The forward drop takes place in advance of the tonneau door. This eliminates the necessity of an additional step and also allows of a wide door, furnishing easy access. Bottle-necking the frames at the dash is introduced by this concern for the first time. The object of doing it is to allow the cars to turn in a smaller-diameter circle than was formerly possible.

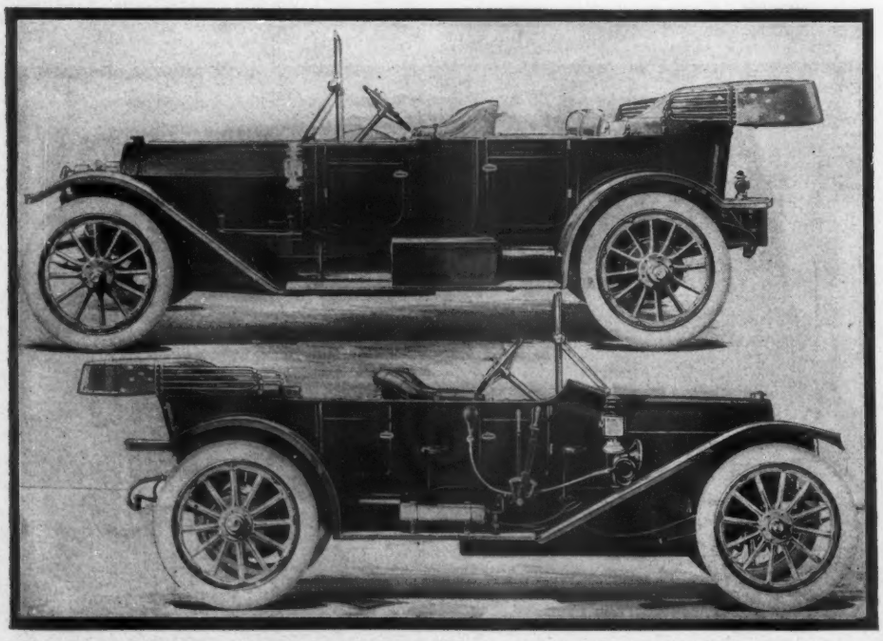


Fig. 7—The Upper Illustration Shows the Six-Cylinder Kissel for 1912 With Ventilated Fore-Door Body and In the Lower Illustration Is the Model 50 Semi-Touring Car, Which Is an Elaboration of the Baby Tonneau Type of Body Design

Generally speaking, few changes have been made on the running gear specifications. For example, the wheelbase measurements on the 30, 50 and 60 have not been altered. These measurements show a general progression in the size of models and are as follows:

Model 30	116 inches
Model 40	118 "
Model 50	124 "
Model 60	132 "

There has been a perceptible change in nearly all of the models in increasing the size of the tires as follows: On model 30 they remain as they were, namely 34 by 4 inches all around; on the new model 40 they are 35 by 4½ all around; on the 50 they are 36 by 4½—this year they are 36 by 4; and on the 60 they are 37 by 5—this year they are 36 by 4 and 4½.

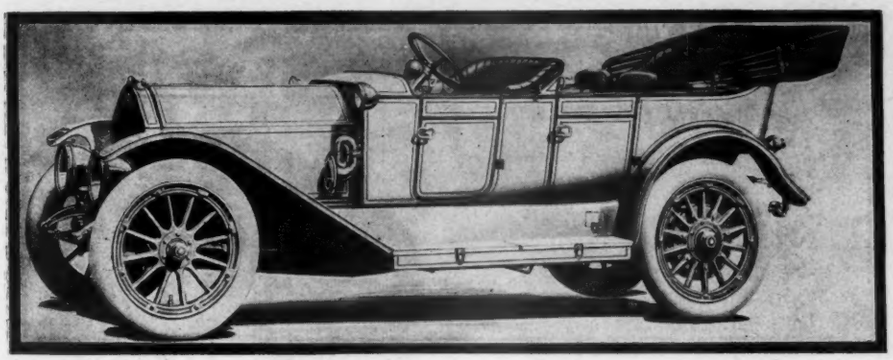
The sizes of the four Kissel motors make it evident that there is a slight leaning towards that motor design in which the stroke is a little in excess of the bore. Here are the four sizes:

	Bore	Stroke.
Model 30	4¼ inches	4¼ inches
Model 40	4½ "	4¾ "
Model 50	4½ "	5 "
Model 60	4½ "	4¾ "

From this it will be seen that the cylinder castings used in the 40 and six-cylinder 60 are of the same size, so that the company is required to turn out but three different cylinder castings for its four models. These cylinder sizes are practically the same as this year with one exception. Sizes in model 30 are the same; model 50 has been altered by making the stroke ¼ inch longer than this year, and in model 60 no change has been made.

With four different models ranging in power from the 30 to the 60 motor and in wheelbase from 116 to 132 inches there is offered to Kissel purchasers a wide choice of chassis. In addition to this, the variety of bodies from the semi-racer fitted to the model 30 chassis to the 7-passenger touring car of the model 60 gives a great deal of latitude as to superstructure.

Stoddard Adopts Six-Cylinder Knight



Stoddard-Dayton Six-Cylinder with Knight Motor

ONE of the five Stoddard-Dayton models for next year will be known as the Stoddard-Dayton Knight and it will have a six-cylinder Knight type of sleeve-valve motor. Motor Age some months ago announced that the Dayton company was one of the four American concerns to purchase a royalty privilege for manufacturing this type of motor. The Stoddard-Dayton people are not using this motor exclusively, however, as the company lists four other models, two of which use the valve-in-the-head type of four-cylinder motor that the company has built for several years, and two other models which are fitted with L-type of motors of the four-cylinder class.

The Stoddard-Dayton-Knight model has been taking the road tests since last May and goes out as a tried and tested car and not an innovation. The motor used is a six-cylinder design, 4½ inches bore and 6½ inches stroke, giving an S. A. E. rating of 48.2 horsepower. It is the first six-cylinder of the Knight type to be built in America, consequently its performance will be watched with special interest. Unlike the majority of six-cylinder motors it has the cylinders cast in two groups of three cylinders each, a type of casting which is coming more and more into popularity. The motor also uses a silent chain to drive the eccentric shaft which operates the reciprocating sleeves.

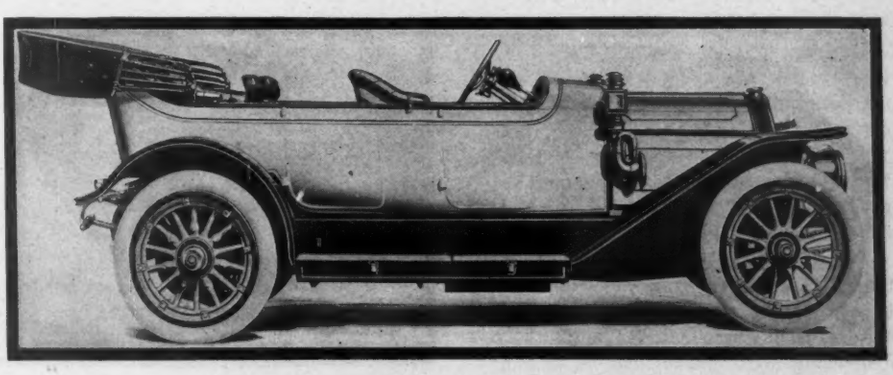
But the entire novelty of this new Stoddard model is not all confined to the sleeve valve motor. The car, too, has its features. The major factor is placing the steering wheel on the left hand side and putting the emergency brake lever and the change speed lever in the center of the floor board for operation with the right hand. This is the second announcement for 1912 of a large six-cylinder car with left-hand control. These two examples will have the effect of greatly hastening the use of this design of car.

Referring in detail to the Knight type of motor, it is a conventional design, built along the same lines as those used in Europe for several seasons, namely, Daimler, Panhard, Minerva; and Mercedes, brought out 6 months ago. In each cylinder are two reciprocating sleeves, one inside the other, and both moving up and down between the piston and the cylinder wall. Each sleeve has two slots near its upper end, one cut in the right side and the other in the left side. In the cylinder casting are corresponding slots, those on the right side constitute the intakes and those on the left the exhausts. The reciprocation of the sleeves is very short as compared with that of the piston so that the sleeve speed is scarcely 100 feet per minute when the motor is generating its full power. These sleeves are gray iron castings finished inside and outside by grinding on special grinding machines. On the outer surfaces oil grooves are cut to distribute the oil over the entire face of the sleeve. As with other Knight types of motors, the cylinder heads are separate castings, which rest well down into the top of the cylinder, and leave an annular space between itself and the cylinder walls for the top of the sleeves to work in. Compression rings are carried at the cylinder head to prevent loss of compression from the combustion chamber. The cast iron parts used in the motor are imported in the rough casting from England, the iron analysis being one best suited for such purposes and well tested out. It has a very high tensile strength.

A new detail of construction in this motor and one of importance in the generation of power as well as in the longer life of the parts is the use of a seven-bearing crankshaft. The use of a seven-bearing shaft was common in six-cylinder types when the cylinders were cast separately. When twin castings were introduced the bearings were generally cut to four, yet there are a few concerns in America now building six-cylinder motors with twin castings in which seven bearings are used. But this new Stoddard goes one step farther and casts the cylinders in threes and also uses seven bearings. Seven bearings prevent any possibility of whipping of the shaft, which is further guarded against by the use of a very heavy shaft. To go further, it is offset from the center of the cylinder, and the connecting rods are considerably longer than twice the piston travel. Both of these factors combine to give a very quiet motor, and a powerful one. In continued brake tests this motor, although rated officially at 48 horsepower, generated as high as 72 horsepower.

This new Stoddard-Knight motor has a few other characteristics, one of which is the movable trough system of oiling. Beneath each connecting rod lower end is a transverse oil trough hinged at one end to one side of the crankcase and carried at the other end on a support which allows of raising or lowering the troughs so that the small scoops of the connecting rod caps can slip more or less into the oil. This regulating mechanism for these oil troughs is connected to the throttle control on the steering wheel, so that as the throttle is opened the troughs are raised to give more oil. With almost closed throttle and the motor working slowly the troughs are lowered and very little oil is fed. The oil is fed into each of these troughs from a pump carried in the base of the crankcase.

A novel method is used to eliminate the noise of the air entering the carbureter. In the upper part of the crankcase are coreways through which the air passes before reaching the carbureter. This stops the wheezing air sound and the air is heated by its proximity to the oil, and the oil in the motor correspondingly cooled.



Stoddard-Dayton Six-Passenger Torpedo for 1912

France After $500 Car

It Is a One-Cylinder Type—Sleeve-Valve Motor on Short Wheel Base

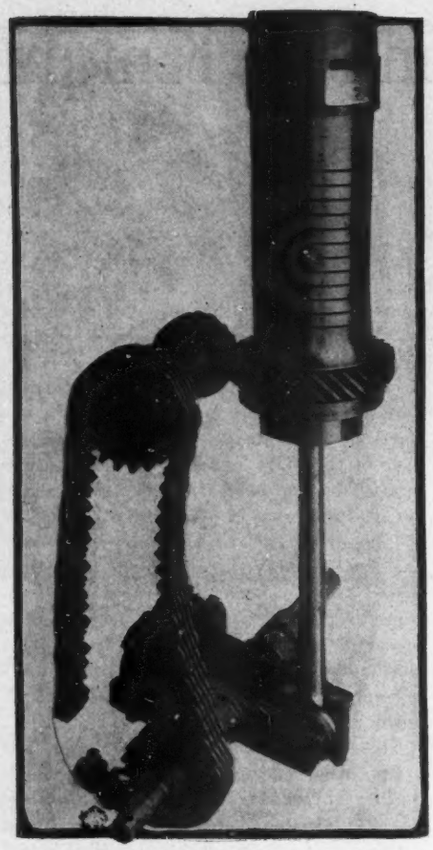


Fig. 1—The C. L. C. Rotating Sleeve Motor, Which Sleeve Is Driven by Silent Chain from the Crankshaft. The Sleeve Has a Single Port in Its Upper End Which Registers with the Intake and Exhaust Passages in the Cylinder Casting. The Sleeve Is Driven by Gear and Pinion at Its Lower End and Has Double Thrust Bearing Shown in Fig. 2, Which Carries the Weight. A Spiral Oil Groove is Cut in the Wall of the Sleeve, and in Addition a Lead From the Oiler Pours Oil Into the Top of the Cylinder Above the Sleeve.

PARIS, Aug. 4—Five hundred dollars is the figure at which a score of manufacturers in France are endeavoring to produce a complete two-seated runabout. With a few exceptions the firms are newcomers with more ideas than capital, which explains, to a certain extent, why the problem of producing at a low price is so difficult; the big firms having the money are afraid to risk it in building a car for the masses, and the small ones having the ideas are lacking the capital to take advantage of the economies obtainable through big series.

During the past few days two more of this type of car have been placed on the market, and although the financial backing of the companies is such that the vehicles will not make a commotion in the car world, they are of interest as mechanical productions and as an example of what France is doing on these lines.

The C. L. C. is the more original of the two. Its motor, designed by Da Costa, a French specialist in internal combustion motors, is a single-cylinder vertical type, dispensing with poppet valves and having instead rotary sleeves, Fig. 2. There are a few points which recall Knight practice: thus the head H is separate and descends into the cylinder, the top of the sleeves revolving between the outer diameter of the head and the inner diameter of the cylinder. The intake and exhaust ports A and E, Fig. 5, which is a diagram of the cylinder as seen from the top, are in the cylinder walls at an angle of, roughly, 90 degrees one from the other. The sleeves, revolving within the cylinder at half engine speed, are provided with a single port E of large area and slightly oblong in shape, alternately communicating with the intake and the exhaust ports.

The method adopted by the designer of the C. L. C. to assure gas tightness is to fit the sleeve with a very deep compression ring R, having overlapping ends and an opening corresponding with E in the wall of the sleeve. As the ring is pinned in position, as is sometimes done with piston rings, it revolves with the sleeve, and by reason of its extensibility prevents all leakage of gas around the intake and exhaust ports. The conditions under which it works are fairly satisfactory, for being outside the sleeve is not subjected to the direct flames of the exhaust gases. In addition to the deep compression rings R there are three others of about the same depth as a piston ring, one being carried at the top of the sleeve, and two others lower down; these three, however, are in no way connected with the admission and the exhausting of the gases.

The combustion chamber is hemispheric, with the spark plug mounted in the head and a compression cock on one side of the head. The piston P has a dome head and is fitted with three compression rings.

Lubrication of the motor is by splash from a belt-driven Dubrulle dashboard lubricator. But in addition to this there is a separate lead, through a very small-diameter pipe, to the head of the revolving sleeve, the oil brought to this point being carried down a spiral groove so as to cover the whole of the surface between the sleeve and the cylinder walls.

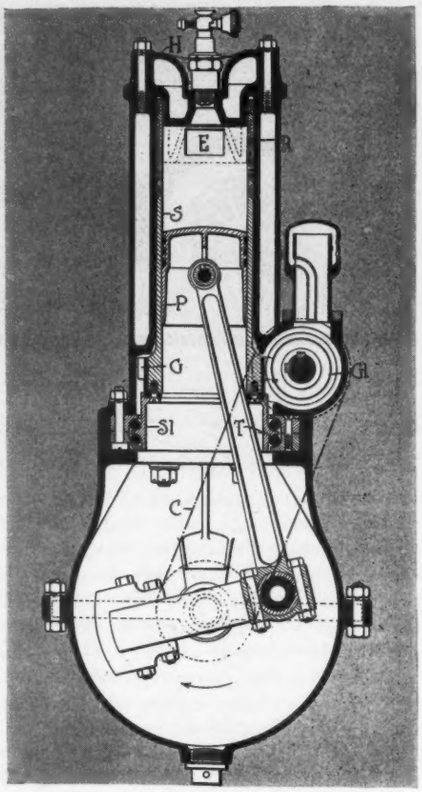


Fig. 2—Rotary Sleeve-Valve C. L. C. Motor. The Parts Are: S, Rotary Sleeve; R, Broad Ring on Sleeve; E, Port in Sleeve; T, Thrust Bearing; S1, Bearing Cage; P, Domed Head Piston; G, Gear on Sleeve; G1, Pinion for Drive; C, Silent Chain to Drive Pinion G1

The method of operating the sleeve is immediately visible on reference to Fig. 2. It will be seen that a pinion on the forward end of the crankshaft is connected up to a two-to-one shaft by a Renold's silent chain, and that a helical pinion G1 on this shaft meshes with a gear G cut on the base of the sleeve. There are thus four gear wheels in the motor, and as two of these only are in direct connection, and the chain is silent, it can be readily under-

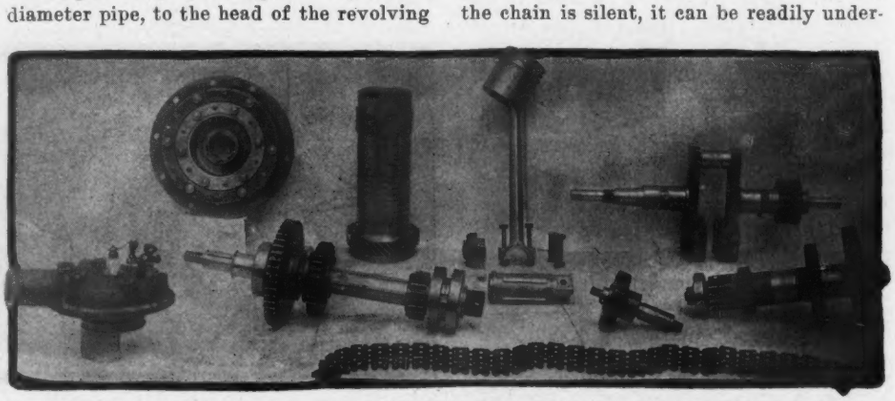


Fig. 3—Assembly of Parts in Motor and Gearset of C. L. C.—The Low-Priced French Car

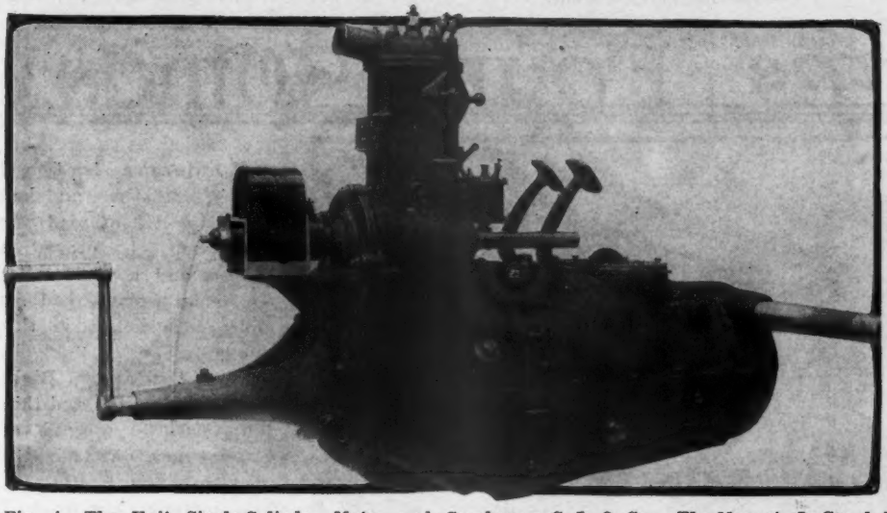


Fig. 4—The Unit Single-Cylinder Motor and Gearbox on C. L. C. Car—The Magneto Is Coupled Direct to the Front End of the Half Time Shaft Which Drives the Rotary Sleeve Valve

stood that the little one-lunger can give points to many high-grade four-cylinder motors in the matter of silent operation.

In Fig. 1 a spiral oil groove is shown on the sleeve, but only the deep compression ring is fitted, the three others not being in position or are their grooves cut. Extra pinions are required for driving the high-tension Gianoli magneto, this, as can be seen from Fig. 4, being mounted on a platform at the front of the motor and connected up by a dog clutch to the two-to-one shaft. The rear extension of this shaft is explained by the fact that it receives a pulley driving the dashboard lubricator by belt connection. The driving chain is carried in a separate housing at the front of the motor and runs in gearset grease instead of oil. The latest type of Longuemare carbureter is the standard fitting with this motor, and with it the little 3.1 by 5.5 inch one-lunger has been throttled down to 139 revolutions per minute, and accelerated to 2,000; its normal speed is 1,500 revolutions a minute. This speaks very well for the flexibility of the motor, a feature in which single-cylinder engines are usually weak.

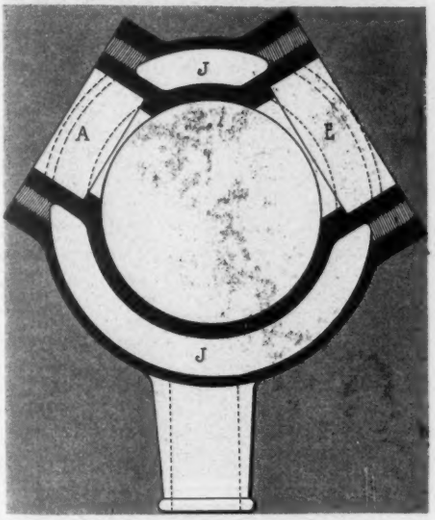


Fig. 5—Horizontal Section of C. L. C. Cylinder, Showing Intake A and Exhaust E. The Water-jackets are J

The unit construction of motor and gearbox, Fig. 4, is a novelty from the French standpoint. The crankcase, contrary to usual single-cylinder practice, is divided horizontally, the cylinder being bolted to the upper half, with the double thrust bearing T, Fig. 2, for the revolving sleeve carried within the base of the cylinder and brought away with this latter when dismounted.

The gearbox, cast in halves, is bolted to the crankcase, and in the forward end of the box is a separate compartment, Fig. 6, carrying the multiple-disk clutch. The motor base, the clutch casing and the gearbox are distinct compartments, each with its own filler for lubricant and its own draw-off plug. There is a large inspection plate on the top of the gearbox, and the vertical division between this and the clutch housing is cut away sufficiently to allow the hand to be passed in from the gearbox inspection cover to the clutch. The gearset is of the sliding type providing three speeds and reverse with ball bearings for both primary and secondary shafts. The final drive follows standard lines, by means of propeller shaft and floating type of rear axle. The foot brake is on the gearset, and the hand brake, with equalizing mechanism, on the rear wheel drums.

The car has a two-seated torpedo body, and although at present produced with wood artillery type of wheels, will later be fitted with demountable wire wheels at no extra cost. Its wheelbase is 78 inches and tread 46 inches. It is a matter of speculation as to whether a car can be sold profitably at this price to the European trade.

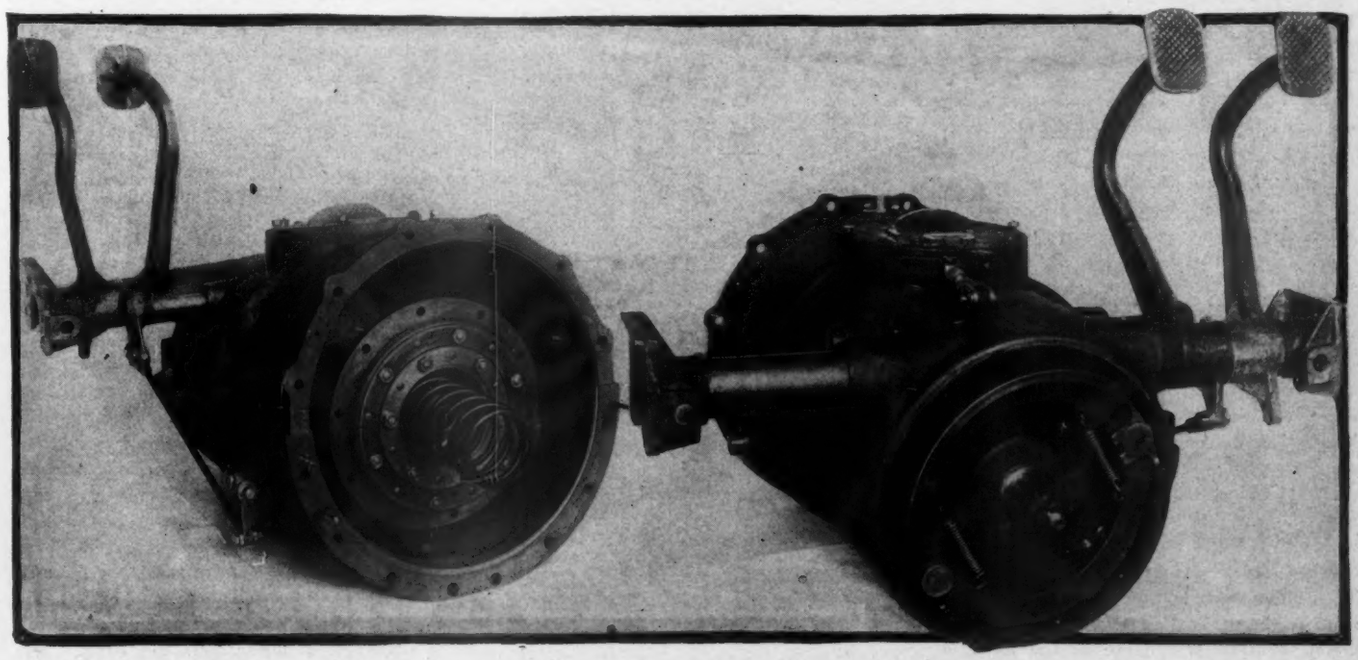


Fig. 6—The Left Illustration, Showing the Front of the Gearbox with the Multiple-Disk Clutch, and in the Right Illustration Is Seen the Rear End of the Gearbox with the Expanding Pedal Brake. The Gearbox Is Extended to Form a Cover for the Brake

From the Four Winds

WANT to Put Up Signs—Sebring, O., is going to organize a club, to have for its principal object the placing of road signs. Other pottery towns near by will be joined in the project.

Want to Form a Club—Motorists of Brooke county, West Virginia, are preparing to organize a big club. This will also take in the towns of Steubenville, O., and Wellsburg and Follansbee, W. Va., and it is intended to enlist all the prominent Ohio river drivers within a radius of 50 miles.

Sweepstakes at Columbus—Arrangements have been completed by the Columbus Automobile Club of Columbus, O., for a 200-mile sweepstakes race, to be run on the Columbus driving park track September 3. The contest will be a sweepstake with a purse of $1,000 to the winners, in addition to $1,500 in trophies. The race will be limited to cars of 600 or less cubic inches and the drivers who participate must reside in the state of Ohio.

Marylanders to Meet—The next meeting of the Automobile Club of Maryland will be the annual one, at which much important business, besides the election of officers, will be transacted. Because of the excellent records made by President H. M. Rowe and Secretary H. M. Luzius, it is practically a certainty they will be unanimously reëlected for another term. Many new members have been brought into the club the past year during their incumbency, while another big feature of their administration which is appreciated by the members as well as other motorists both in and out of the state is the posting of roads between Baltimore and Philadelphia and other sections of the state.

Cement Straw Road—A novel method of roadmaking has been discovered in Mississippi county, Missouri, by R. S. Hanford, southern Missouri distributor of the Rayfield carbureter. The roads, which are extremely sandy in that locality, are covered with wheat straw to a depth of a foot twice a year. The straw then is covered with sand from the road, and in a short time the former is thoroughly embedded in the sand by the traffic passing over it. Then a strange transformation occurs. The mixture undergoes some chemical change, cementing itself together, making a surface nearly as firm as a crushed stone or a smooth gravel road. This economical method of road-making is said to have been discovered by watermelon haulers, who were in the habit of of drying up boggy places by throwing straw in them. It was noticed that these places became hard and firm after a time, and last year a stretch of road was attempted. It proved a success and now 50 miles of cement-straw road is under construction in this county.

OMAHA POSTING SIGNS

The Omaha Motor Club has started the work of placing signs on all of the principal roads leading into Omaha. It claims to have the most permanent posts of any used now. The posts are made of reinforced concrete, designed especially for this purpose. They are 8 feet in length, 2 feet being planted in the ground, and are 4 inches square.

The first road to be marked was that running from Omaha to Tekamah. This road was marked last week, the posts being piled in two motor trucks, and Charles L. Gould, president of the club, W. J. Kirkland, secretary, Lee Huff, of the Nebraska Buick Co., and L. Doty, of the United Motor Omaha Co., going along to plant them. The route had previously been accurately surveyed by engineers, and the distances exactly computed.

The signs are of iron, the letters painted in white on a black background. The signs bear the name of the nearest town and the distance, or give the distance to Omaha or Tekamah, as well as the club insignia. A contract has been let to a painter to paint these twice yearly. The towns passed through on this route are Florence, Calhoun, Blair, Herman and Tekamah. The next road to be marked will be to Nebraska City. The Omaha club will mark all roads within 50 miles of Omaha.

New Castle on Right Track—It is estimated that fully $900,000 worth of cars are now owned in the town of New Castle, Pa. The increase the past 2 years has been fully 50 per cent and the average valuation of the cars owned in the town is placed at $2,000.

Ford Climbs Capitol Steps—Harlan W. Major, manager of the Major Auto Co., Nashville, Tenn, drove a model T Ford up the steps of the state capitol, through the hall, out of the rear entrance and around the drive at Nashville.

Club at Akron—The Akron Automobile Club, of Akron, O., has been incorporated with an authorized capital of $10,000, for the purpose of promoting in every practical manner the interests and rights of those owning and operating motor cars, and to encourage and promote the cause of good roads and the improvement of the state's highways. The incorporators are L. F. Samson, Guy E. Norwood, L. D. Brown, J. B. Campbell, B. A. Palsky and George G. Allen.

Distributing Road Fund—State Treasurer Murrow, of Iowa, is in a muddle over the distribution of the first funds to be derived from the new motor tax law, which went into effect July 4. A decision from Attorney General Cosson ruled that the law provided for distribution according to the civil townships in each county, but a number of county auditors have certified to lists drawn for the congressional townships, and accordingly many padded lists are said to have been presented to the treasurer.

Riding Good Roads Hobby—B. F. McMillan, millionaire lumberman of McMillan, Wis., 5 miles north of Marshfield, Wis., a director and member of the good roads committee of the Wisconsin State Automobile Association, is giving a practical illustration of his hobby. The highway between McMillan and Marshfield is one of the finest in the United States and is at all times as smooth as a bowling alley. Mr. McMillan personally paid for the improvement of the road and supervised the work. After each rain the man of millions is to be seen at the wheel of his big touring car, to the rear end of which is attached a King split log drag. Mr. McMillan takes genuine pleasure in keeping the road in good condition. It is a

public highway, but others who use it use the same precautions as the man responsible for its present excellent condition in order to maintain it so. The influence of Mr. McMillan's work is reflected throughout the territory in highway improvement activity.

Baltimore Seeks Reforms—The anti-noise ordinance which Councilman Heatwole will present before the city council of Baltimore has been endorsed by the Automobile Club of Maryland. It is along the lines of that in New York for the abolition of disorder in the hospital zone. The club at its monthly meeting also named a committee to take up with the judges of the appeal tax court the question of having an established scale for taxing different makes and models of motor cars. Better lighting and improvements on Belvidere avenue, between the Reisterstown road and Park Heights avenue, were advocated by the club. At the annual meeting in October the club hopes to have the membership above the 1,000 mark.

Connecticut's Count—According to the report of the secretary of state, who has in charge the registration of motor vehicles in Connecticut, the state issued, for the year ending July 31, more than 15,000 licenses for motor vehicles and 17,000 licenses to operators. The vehicle licenses were divided as follows: 12,560 private registrations, 374 dealers, twenty-three liverymen, 1,581 motor cycles, 17,298 operators' licenses, 1,176 motor cycle operators' licenses. During July the number of registrations dropped off materially, there being 837 private registrations, twelve dealers, 135 motor cycle licenses, 1,212 motor vehicle operators' licenses and ninety-five motor cycle operators' licenses. June and April were the largest months in point of volume for the department, the latter month being the largest. May was a bigger month than July, however.

Good Work in Richmond—The Richmond Automobile Club of Richmond, Va., has secured the aid of the Business Men's Club and the Chamber of Commerce to induce the finance committee of the city council to appropriate $5,000 in the aid of good roads. The proposition has much encouragement, and it is thought it will go through.

Marking Pacific Highway—Within 4 weeks sign posts will have been erected in Oregon from north to south, marking the route of the Pacific highway through Oregon. It has already been marked through Washington and California. M. C. Dickinson, of the Portland Automobile Club, at the meeting of the highway association pledged himself himself to see that this work is done. An order has been placed for the signs and as soon as completed F. M. Fretwell, of Seattle, secretary of the association, and M. K. McRae will travel over the route and have them set in place.

Sanitary Experts Reach Coast.—B. O. Tilden, president of the American Sanitary Works, who left New York on April 20 with a party of specialists to conduct a national educational campaign in the interest of sanitation, arrived in Los Angeles August 10 in his Stoddard-Dayton. The tourists have covered more than 10,000 miles of their 25,000-mile tour through the United States, British Columbia and the Hawaiian Islands. The trip from New York was made by a circuitous route, including side trips from 100 to 500 miles branching out from twenty cities on the trunk lines across the continent. The tourists sail from San Francisco to Honolulu, taking the car with them for a thorough tour of the Hawaiian Islands.

Big Tag Sale—South Bend, Ind., derived $7,626.25 from a 31 days' sale of vehicle tags, which closed July 31. The total number of tags disposed of was 2,575, which, it is thought, represents little more than half the vehicles in South Bend. Four hundred and ninety-six licenses were issued for motor cars. The revenue derived from the sale of tags for motor cars amounted to $3,015.68. The fine for not having a tag is not more than $50 and double the original cost of the license, but leniency will be shown this year.

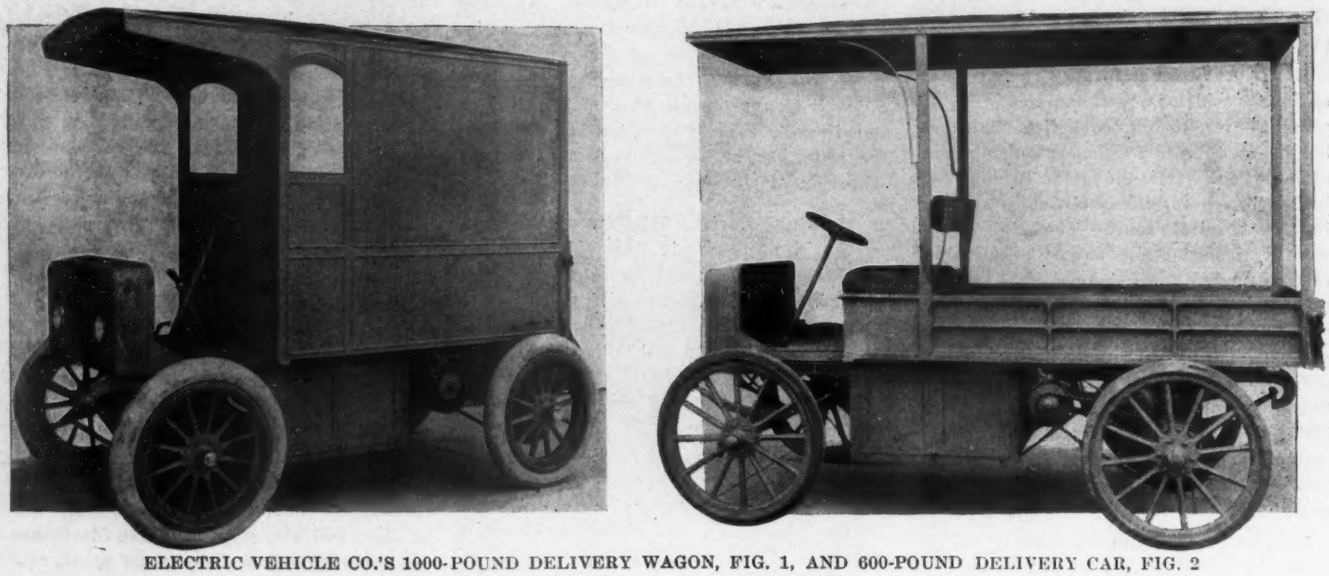
New Hampshire Touring Census—The figures for the month of July show that more than 50 per cent of the visitors to Bretton Woods during the month arrived in motor cars. Of the 2,835 visitors that registered at the hotels there just 1,865 traveled over the road. At the Mt. Washington hotel of the 1,329 guests registered all but 327 came in motor cars, while 863 of the 1,506 who stopped at the Mt. Pleasant were motorists. The total number of cars that were garaged at the hotels during the month reached 448.

Maryland's Tax Receipts—Under the new Maryland state motor vehicle law the receipts available for good roads and improved streets in the state and Baltimore city up to April 1, 1911, are $56,205. This amount is clear of that necessary for the running expenses of the office of the motor vehicle commissioner. The sum does not represent the receipts for an entire year for the law did not go into effect until April 5, 1910, and it required some time for organizing the office. The city's share of the amount is one-fifth of the total, or $11,241.

FOREIGN METHOD OF TIMING ROAD RACES

Undoubtedly promoters of American road races can learn something by studying foreign methods of informing the spectators as to the progress of the race. The recent grand prix was an example of this. The scoreboard was immediately above the timers' stand and directly in front of the grandstand. The accompanying illustrations give a fair idea of the size of the figures used. In the left hand illustration a man has his head and shoulders through one of the spaces used. These figures are put up from the rear of the big board

Louisville Plant Making Electrics



ELECTRIC VEHICLE CO.'S 1000-POUND DELIVERY WAGON, FIG. 1, AND 600-POUND DELIVERY CAR, FIG. 2

A 1,000-pound electric delivery wagon with full curtain express body, Fig. 1, and a 600-pound delivery wagon, Fig. 2, with full panel body and pneumatic tires, have recently been announced by the Electric Vehicle Co., Louisville, Ky., which is a new entrant into the electric vehicle field.

Fig. 3, a top view of the chassis, shows the general scheme of construction, which includes a General Electric motor G suspended from the car frame immediately in advance of the rear axle. From this motor power is transmitted by a silent chain C to a countershaft S and from this countershaft by roller chains C1 to the rear wheels. The silent chain C is enclosed in a dust-proof steel case, which is removed in the illustrations. The countershaft S is carried on ball and roller bearings and the shafts are encased in a housing much the same as the housing for a rear axle in a shaft-driven car. The motor G has its armature shaft carried on Hess-Bright bearings and the rear road wheels of the vehicle are carried on Bowers roller bearings.

The battery equipment is carried in a tray midway of the axles and below the frame level. In the 600-pound car the battery is made up of thirty cells of eleven-plate lead battery; and in the 1,000-pound wagon the battery equipment is fifty A-4 Edison cells. This equipment is sufficient for a mileage for from 40 to 55 under normal service conditions. Looking further at Fig. 3, the controller K is seen located in the dash. This controller is of the continuous torque type and permits of four forward speeds and two reverse changes. The controller bolts to the dash and is protected by a short hood. In this position it is very accessible, being exposed by the removal of a panel from the dash. The panel is secured by four thumb nuts. The wiring from the controller to the motor is carried in separate framework which passes over the top of the battery.

The question of control is an interesting one in electric vehicles and this has been worked out with particular care by this Louisville company. The steering column is on the left-hand side. To the right of the driver are the control lever CL, Figs. 5 and 6, which operates the controller, and the emergency brake lever BL which operates on expanding shoes within the rear wheels, this operation being through the equalizer E, Fig. 3. A further control is the brake pedal BP which controls service brakes B which are contracting bands operating on drums 8 inches in diameter with 2-inch face on the outer ends of the countershaft. This gives two sets of brakes of the mechanical type, both of which are entirely free of the electrical mechanism of the car. Referring further to Figs. 5 and 6, M is the ampere hour meter, ES is the emergency switch showing its closed position, LS is the lamp switch, and BB the bell button.

Fig. 5 shows this control mechanism with the floor board and dash panel removed. In this illustration the controller is seen to advantage and also shown are the two concealed electric lights L which are entirely carried in the small dash and appear to advantage in Fig. 1.

In the matter of controlling this car the controller lever CL is moved forward of the vertical position for the four forward speeds and backward of the vertical for the two reverse. Before passing from neutral to reverse a latch Z must be raised and the lever given a side movement, which furnishes a double safeguard against accidentally throwing in the reverse speeds. When the car is at rest both the controller and brake levers are vertical, affording an easy access to the car. The emergency lock switch ES opens the circuit when the plunger P, Fig. 5, is pulled out, as illustrated. This plunger locks in the open position and cannot be pressed in until a Yale key, Fig. 6, is used.

The running gear on these vehicles is

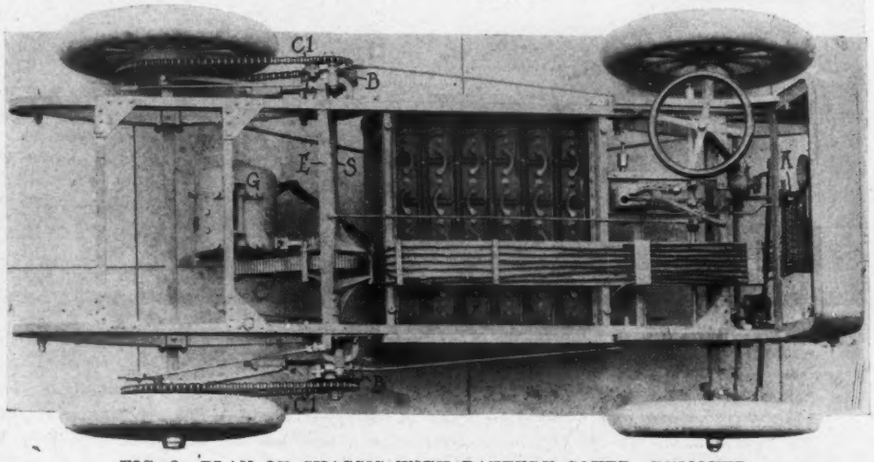


FIG. 3—PLAN OF CHASSIS WITH BATTERY COVER REMOVED

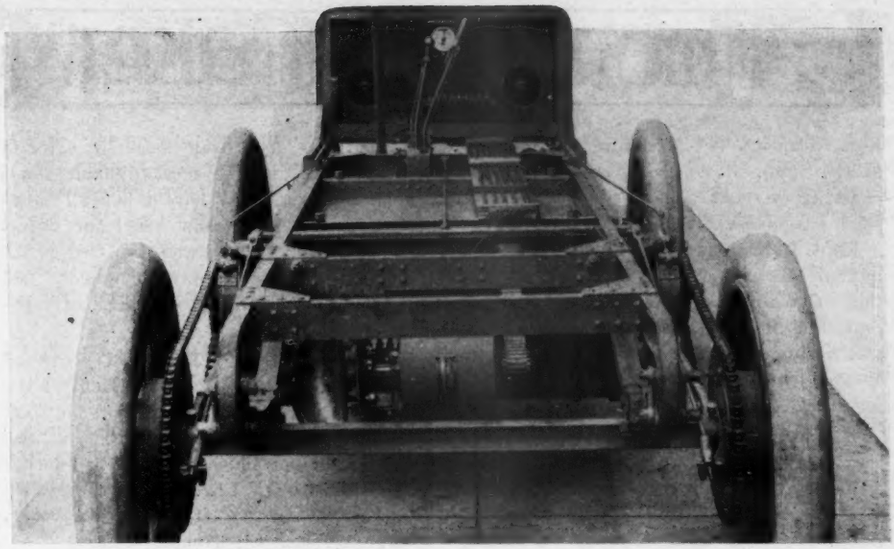


FIG. 4—REAR VIEW OF CHASSIS SHOWING ACCESSIBILITY OF ALL PARTS

illustrated to advantage in Figs. 3 and 4. The frame is built up of channel section side members much the same as used in a gasoline car; and the subframe carrying the batteries is supported by truss rods which extend from the forward cross member to the rear cross member. These truss rods prevent sagging of the side members. Both front and rear axles are I-beam forgings. The steering knuckles are of the reversible Elliott type. Bowers roller bearings are used in the front wheels. Front and rear springs are semi-elliptic. Steering is through a semi-reversible worm-and-gear mechanism with ball thrust bearings above and below the worm.

Special precautions have been taken to preserve the entire chassis by careful lubrication. The brake and control shafts are made hollow and provided with one large grease cup each by means of which grease is forced to all points calling for it. Grease cups made integrally with the hardened and ground shackle bolts insure lubrication of the spring eyes. Oil and grease cups are provided on all steering connections and steering knuckle pins.

Some of the specifications are: Both wagons are made with wheelbases measuring 86 inches. The tires on the 600-pound wagon are 34 by 2½-inch Diamond side-wire types; and on the 1,000-pound wagon are 36 by 2½-inch of the same make. The 600-pound wagon has a load space 60 inches long, 42 inches wide and 60 inches high; the 1,000-pound wagon has a space 73 inches long, 42 inches wide and 63 inches high.

COMPARATIVE COST

At the request of the city administration, Wilson E. Snyder, clerk of the board of public safety of South Bend, Ind., has prepared figures on the comparative cost of the motor patrol, which was placed in commission 6 months ago. During the 6 months it has been in use 1,101 arrests have been made and 2,504 miles covered. In the 12 months of 1909 there were 1,651 arrests and 2,927 miles covered by the horse-drawn patrol. To make clear to the city council the efficiency and economy of the motor patrol, tables of comparative expense have been made out. The investment in horse and wagons and paraphernalia in 1909 was put at $1,527 and the interest on the investment at 6 per cent $91.62. Horseshoeing for 1909 cost $236.05; forage, $534.65; bedding, $150.50; veterinary services, $22.50; repairs, $66.48, making the cost for operating for the year $1,101.80. In contrast is put the cost of operating the motor patrol for 6 months. Included in the figures is the cost for 27 days of last December. Investment, $4,831.50; interest on the investment at 6 per cent for 6 months, $144.94; supplies, $27.85; lubricating oil, $21.25; hard grease, $6.75; gasoline, $59.36; repairs, $37.26; total for 6 months, $297.41. Estimated cost for operating for 1 year, $594.82. Cost per mile run under the old system, 37½ cents;

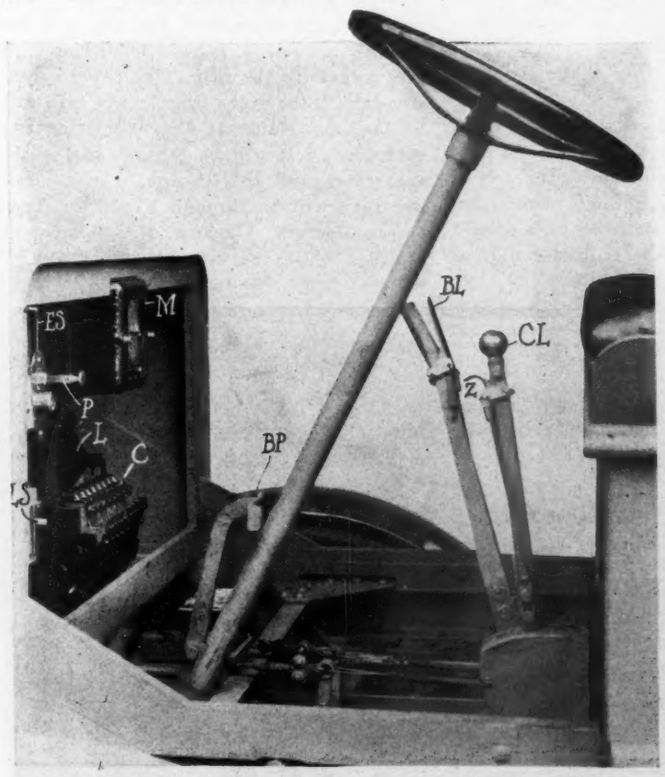


FIG. 5—ILLUSTRATING CONTROL DECK WITH DASH PANEL AND FLOORBOARDS REMOVED. BP., BRAKE PEDAL; M, AMPERE-HOUR METER; ES, EMERGENCY SWITCH, OPEN; LS, LAMP SWITCH; C, CONTROLLER; L, LAMP; P, SWITCH PLUNGER

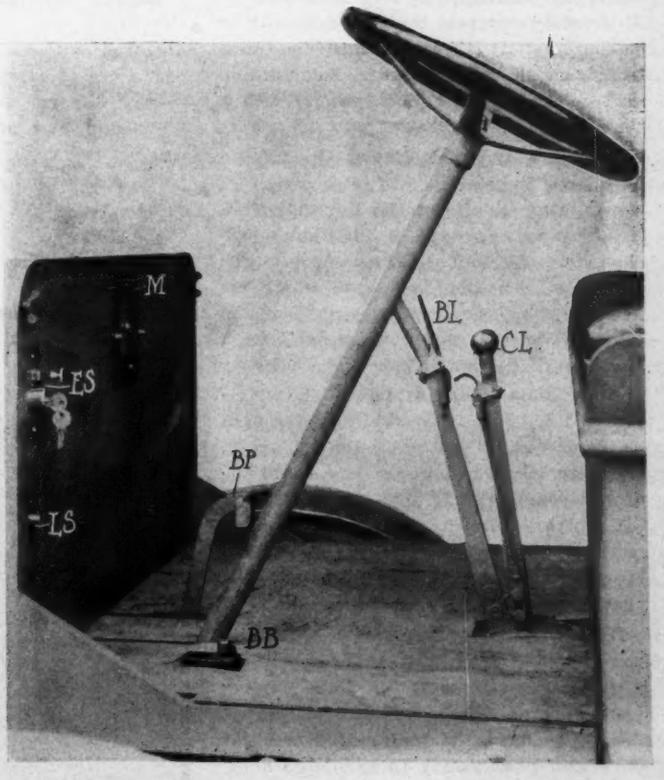


FIG. 6—ILLUSTRATING CONTROL DECK AND DASH. CL, CONTROLLER LEVER; BL, BRAKE LEVER; M, METER; ES, EMERGENCY SWITCH, CLOSED, SHOWING YALE LOCK AND KEYS; BB, BELL BUTTON; BP, BRAKE PEDAL; LS, LAMP SWITCH

TWYMAN MOTOR CAR CO., COLUMBUS, O.

Among the Makers

MEMBERSHIP Growing — There now are more than 225 concerns allied with the Motor and Accessory Manufacturers.

More Data Sheets—The Society of Automobile Engineers has distributed three additional pages for the S. A. E. Handbook. These pages cover dimensions with illustrations of the standard yoke and eye rod ends.

New Prest-O-Lite Depot—A new Prest-O-Lite depot has been established at North Capitol Avenue boulevard and Vermont street in Indianapolis. It is housed in a one-story concrete building and will be in charge of W. B. Carpenter. When tanks are fitted to cars, a special examination will be made of all pipe fittings, with a view to preventing leaks.

Can Use Imperial Name—The Hearn Tire and Rubber Co., of Columbus, O., central Ohio agent for the Imperial tires, has received word of a favorable decision from the United States court in the southern district of New York which upheld in every particular the right of the company to the name "Imperial" as a trade mark for motor car tires.

New Mais Headquarters — The Mais Motor Truck Co. has established its main offices on North Capitol Avenue boulevard, Indianapolis. The company has leased one of the concrete buildings in the row, at 515 North Capitol avenue. This also will be the headquarters of the Indianapolis Motor Car Co., which has the Indianapolis agency for the Mais trucks.

Kinsey Company Expanding—The Kinsey Mfg. Co., of Toledo, is constantly expanding its business and finds a growing demand for accessories turned out at its plant. To meet the increased demand it has found it necessary to add large additions to its new factory building. The contract has been awarded for the erection of a large new building in the immediate future. The structure will be four stories high, of concrete, brick and steel construction, and will cost nearly $25,000 when completed.

Kent Lubricating Co. Election—At the annual meeting of the Kent Lubricating Co., of Waukesha, Wis., all officers were reelected and a dividend of 10 per cent was declared, payable December 1. E. K. West is president and W. W. Wight is secretary.

Wisconsin Motor Used—In the description of the Stutz car, published in Motor Age July 27, reference was made to the motor as being one of Continental design, which has been misunderstood as having reference to the motor of that name, whereas it is the Wisconsin motor, made by the Wisconsin Motor Mfg. Co., of Milwaukee. The Wisconsin motor is used exclusively on all Stutz cars.

Organizes in Canada—The Schacht Motor Car Co., of Cincinnati, has completed arrangements for the organization and capitalization of a corporation to be known as the Schacht Motor Car Co., of Canada, Limited. The capital of the company is $350,000; associated with the Cincinnati firm are some prominent Canadian financial organizations. The manufacturing plant has been located at Hamilton, Ontario, where it already has secured a new building containing 40,000 square feet of space.

Regal's Test Track—The Regal Motor Car Co., of Detroit, is ingenuously arranged with hazards and typical road conditions of every section of the country, so that the car may receive every possible strain and action that it can ever receive, no matter where it goes. At one place in the track, for instance, there is a ⅛-mile stretch of sand through which the car is run, time after time, on high speed. This sand is not of the civilized building variety, but has been selected after a careful study of the most difficult sands encountered and the hardest of all sands to negotiate. The fine beach or desert sand was finally selected by George D. Wilcox, assistant general manager, and imported by the carload to be used in building this track.

Haynes Officers Reelected — Elwood Haynes has been reelected president of the Haynes Automobile Co. at Kokomo, Ind. Following is the ticket in full that the organization continues in office for another year: President, Elwood Haynes; vice-president, C. C. Cartwright; secretary, George W. Charles; Treasurer, A. E. Starbuck; directors, S. Tudor, A. L. Thalman, J. W. Johnson, Raymond Ruddell, George W. Charles, A. E. Starbuck, of Kokomo, Ind., and C. C. Cartwright and W. M. Haynes, of Portland, Ind.

Another Hoosier Jaunt — The Indianapolis Trade Association, which includes in its membership about 250 manufacturers, jobbers and wholesalers of the city, including practically all of the manufacturing motor car concerns, is arranging a fall buyers' meet and a trade extension trip. On September 4 to 8, during the Indiana state fair week, the buyers' meet will be held for the 14,000 retail merchants of the state. Headquarters will be established down town and each association member will keep open house. There will be motor car rides over the city and the visiting merchants will be furnished with free tickets to the fair. The trade extension trip, to be given later in the fall, will be the most elaborate the association has ever given. It will be through the southern states and to Havana, Cuba. The itinerary will be through Kentucky, Tennessee, Georgia, Alabama, Mississippi and Florida, while the cities visited will in-

STORE OF MOUND CITY BUGGY CO. OF ST. LOUIS

and Dealers

clude Louisville, Nashville, Atlanta, Macon, Savannah, Jacksonville, Albany, Birmingham, Montgomery, Mobile, Meridian, Jackson and Memphis. A special train of dining, day and sleeping coaches will be used. It is likely a small steamer will be chartered to take the party to Cuba for a few days.

The McCue Merger—That the merging of the McCue Co., of Hartford, Conn., and the Superior Axle and Forge Co., of Buffalo, does not mean that the McCue company will move out of Hartford, was the statement of C. T. McCue, president of the concern. The western business of the McCue company will, however, be moved to Buffalo, but the eastern business will be cared for at the Hartford factory. One of the reasons for the merger was the fact that the Hartford plant could handle all of its western business and it was desired to place that business in closer touch with the company.

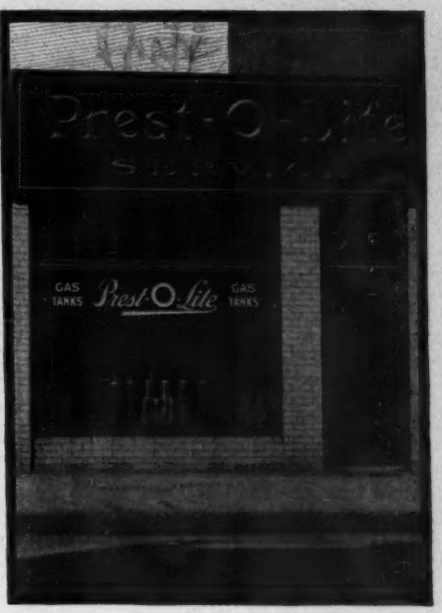
Big Plant for Axle Making—The new structure erected by the Lewis Spring and Axle Co., of Jackson, Mich., is nearing completion. The Park avenue plant of the company will be vacated upon the occupancy of the new building and the concern which will succeed the new firm in factory No. 5 will employ 200 highly skilled artisans. Thus the new building will be the means of giving employment to 400 additional skilled mechanics. The new factory is 250 feet square and has a total floor space of 62,500 square feet. It is a one-story structure of light red brick with ample provision made for fine light and ventilation by means of large and frequent apertures. Glass for roofing will be used. The Lewis company has acted as its own contractors in the erection of the building, purchasing the material and letting the work to the skilled workmen. It is planned to use the new building for the manufacture of motor car axles. It will be devoted exclusively to that class of work and will be the second largest single building in the United States to be used for that purpose, it is claimed.

Winter With Federal Truck—H. L. Winter, formerly with the E. R. Thomas Motor Car Co., of Buffalo, will look after the interests of the Federal Motor Truck Co., of Detroit, in the capacity of sales manager.

Another Republic Building—The Republic Rubber Co., of Youngstown, O., has awarded contract for another new building 75 by 200 feet. This building will be used entirely for the calender department and will be of the saw-tooth type of brick and reinforced concrete construction. It is to be completed by October 1.

Will Have Show and Parade—Des Moines dealers are making big preparations for a floral parade which is to be one of the features of the motor show to be held in connection with the Iowa state fair, the last week in August. The parade will be given on August 26 and there have been many entries. The show is to be held beneath the big steel amphitheater at the race track which affords 30,000 feet of floor space for the show.

Uncle Sam Awards Contracts—The district commissioners of Washington, D. C., have awarded to the Congressional Garage Co. the contract for furnishing the water department with two Wilcox trucks. After bids were opened several weeks ago, exhaustive tests of the various trucks offered in competition were made, and the contract was finally awarded to the Wilcox. The district government is using motor trucks in a number of departments and their use is gradually spreading. The contract for furnishing the government printing office with six electric trucks to take the place of the present system of horse and wagon service is still in abeyance. The public printer is going over the various proposals with great care and is not expected to make a decision in the matter for some time.



PREST-O-LITE ST. PAUL BRANCH

Shiland With Westcott—H. E. Shiland, former sales manager of the Buick Motor Car Co., of Flint, has taken a position as general sales manager of the Westcott Motor Car Co., of Richmond, Ind.

Marion in Old Overland Plant—The Marion Motor Car Co. is now completely installed in the old Overland factories in West Indianapolis, while the Overland will be manufactured exclusively in Toledo, O. No alterations were necessary to make the factory buildings adapted to the Marion needs.

Intend Making Motors—Benjamin Rosenzweig, Jr., and Patrick R. Doherty, of Flint, Mich., are organizing a stock company which will engage in the motor business. The location of the factory has not yet been decided upon, but it is stated it will be either in Detroit or Jackson. Mr. Rosenzweig has been employed by the Buick Motor Co. as sales agent and Mr. Doherty holds a similar position with the W. A. Paterson Co.

Mead at the Helm—Another change in the personnel of the executive staff of the General Motors Co. has just been announced. W. J. Mead, vice-president of the General Motors Co. and general manager of the Olds Motor Works of Lansing, Mich., maker of the Oldsmobile, will act as chairman of the president's council, which practically controls the General Motors Co., during the absence in Europe of President Neal. Mr. Mead will make his headquarters at the general offices of the General Motors Co. in Detroit, where he can be more closely identified with the furtherance of the work of that company. He will, however, retain the management of the Olds Motor Works.

STORE OF CAROLINA GARAGE AND MACHINE CO., RALEIGH, N. C.

Brief Business Announcements

HARTFORD, CONN.—The Buick garage has secured the local agency for the Alco truck.

New York—The Cross & Brown Co. has leased for the A. Elliott Ranney Co. the store at 1928 Broadway to the Bergdoll Motor Car Co.

Hartford, Conn.—The Goodyear Tire and Rubber Co. has opened a branch in this city which will be under its own supervision. It is located at 26 High street.

Milwaukee, Wis.—The Franklin Automobile Co. of New York, capital stock $400,000, has been granted a charter to do business in Wisconsin. The local interest is given at $2,000.

San Francisco, Cal.—The Auto Sales Co., of San Francisco, newly selected agent for the Paige-Detroit, has opened its new salesrooms on Golden Gate avenue. Max L. Rosenfeld is manager.

Sparta, Wis.—Henry Sholts, electrical engineer, has rented the Frazer building on South Water street and will establish a garage and repair shop at once. The building is a new structure and was built for garage purposes.

Indianapolis, Ind.—That part of the estate of R. M. Hutchison, deceased, known as the Morton place livery and garage, has been sold to the Morton Park Automobile Co., of which Arthur W. Hutchison, son of the deceased, is manager.

Los Angeles, Cal.—Leon Shettler, California distributor for the Reo cars, has been busy the past week appointing subagents. A. B. Hendrickson will have the agency in Santa Ana, O. M. Skinner at Anaheim, Sam Tognazzini at San Louis Obispo.

Lima, O.—H. J. Lindesmith and E. R. Lindesmith, partners, doing a motor car business at 206 East Market street, under the name of H. J. Lindesmith & Co., have filed a petition in voluntary bankruptcy in the United States court. The liabilities are placed at $7,395 and the assets at $4,178.

Indianapolis, Ind.—The G & J depot of the United States Tire Co. has been moved to 511 North Capitol avenue, the new quarters having been opened on August 7. Formerly the Indianapolis G & J depot has been located at the factory and the new quarters afford a more central and convenient location.

Brookville, Pa.—Contracts for the leasing of the buildings of the defunct Twyford Motor Car Co. to the Union Auto Specialties Co., of Pittsburg, have been made. The company will install its machinery and enter upon the manufacture of the patent windshield for motor cars, patents for which the company controls. At present the company has about fifty men employed in its smaller plant at Pittsburg.

Spokane, Wash.—C. L. Rose has resigned from the E-M-F Co. and will be succeeded in a few days by A. H. Brown, of Indianapolis.

Louisville, Ky.—A. L. Martin, formerly manager of the Southern Motor Sales Co., is now in Denver, where he represents the Henderson Motor Sales Co., of Indianapolis.

Beloit, Wis.—D. D. Smith, of Cleveland, O., is negotiating for the lease of the Broad street skating rink, which he plans to transform into a garage and repair shop as well as salesroom.

Portsmouth, O.—Walter Ruhlman is planning to open a large garage in Portsmouth. The location has not yet been selected. The building will be constructed on Gallia street and a stock company will be organized.

Albany, N. Y.—The Franklin Garage Co. of Brooklyn has been organized; capital $1,000, consisting of shares of $100 each. The directors for the first year are Peter J. Norton, William J. Fitzgerald and Edward S. Hoffin of Brooklyn.

Atlanta, Ga.—Robert F. Butler, W. L. Moor and J. H. Knight seek a charter for the Piedmont Mfg. Co., to have $100,000 capital. Of this amount, $50,000 common stock, at $100 per share. The privilege of increasing to $500,000 capital stock is retained.

Portland, Ore.—That the Everitt people expect to open a branch in Portland has been verified by W. D. Wallace, who is now in Portland representing the Everitt Northwest Co. Direct branches will be opened in Portland and Seattle for the purpose of supplying Washington, Oregon and Idaho.

Youngstown, O.—Announcement has just been made that the Republic Rubber Co. has commenced the erection of a Pacific coast branch at the corner of Golden Gate avenue and Hyde street, San Francisco. It will be a two-story and basement structure 70 by 157 feet and will be ready for occupancy about September 1 and will be in charge of M. E. Murray, general western manager.

Chicago—The Federal Rubber Mfg. Co. of Milwaukee, Wis., has opened a branch in Chicago. George W. Stephens, formerly with the American Tire and Rubber Co., is manager of the new branch, and Frank Loofbourrow has severed his connection with the United States Tire Co. to become assistant manager. The new quarters are at 1434 Michigan avenue. The territory covered by the Chicago branch will be the entire states of Illinois and Iowa, and the northern portion of Indiana.

Louisville, Ky.—The Goodyear Tire and Rubber Co. has established a branch at 423 West Walnut street, with Robert Harbison in charge.

Louisville, Ky.—The Radcliff Motor Car Co. has incorporated with the Southern Motor Sales Co. to handle the Cole in connection with the Stevens-Duryea in this territory.

Toledo, O.—The Saxon Mfg. Co., capital $10,000, manufacture lamps and a general line of accessories for motor cars. The incorporators are Herman Saxon, Charles G. Cunningham, Richard D. Logan, E. A. Koster and Phyllis Hackett.

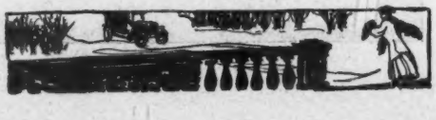
Fond du Lac, Wis.—C. L. Marston has been appointed district agent for the Abbott-Detroit in Fond du Lac, Sheboygan and Green Lake counties, Wisconsin. He formerly was connected with the Milwaukee branch of the Buick Motor Co.

Washington, D. C.—The Marion Motor Car Co. is the name of the new corporation recently formed in this city to handle the Marion and American cars. The premises at 1119 Fourteenth Street Northwest is at present being remodeled into a large salesroom, and probably will be occupied by the concern at the end of the week.

Galveston, Tex.—Moritz O. Kopperl, the Galveston representative of the Inter-State and Everitt cars, announces that during September he will erect a new garage 90 by 150 feet at Tremont street and Avenue P½. The floor space will total 13,500 square feet, giving space for 100 cars. Harry Endicott, racing driver, will manage the new garage.

Boston, Mass.—Kenneth E. Skinner, who now does a large renting business, has leased the old salesrooms on Berkeley street, formerly occupied by the Winton company's branch. By securing these quarters it gives Mr. Skinner possession of the entire building between Berkeley and Clarendon streets, giving him the largest floor space of any local garage for one floor.

New York—Recent appointments of agents to handle the Commer truck for Wyckoff, Church & Partridge are as follows: Dodge Motor Vehicle Co., of Boston, eastern Massachusetts; Skinner Brothers, central Connecticut; Hoagland-Thayer Co., Newton, N. J., upper New Jersey; George H. Snyder, Troy, N. Y.; W. A. Davis, Baltimore, Md., southern states; Motor Sales Co., Washington, D. C., District of Columbia and a portion of Virginia; Fred E. Gilbert Co., Jacksonville, Fla.; Pittsburgh Auto Co., western Pennsylvania, West Virginia and the eastern tier of counties in Ohio; Ohio Motor Car Co., Dayton, O., western portion of Ohio; Be-



noist & Aull, St. Louis, southwestern Illinois and eastern Missouri; J. Wade Cox, Houston, Tex., southeastern Texas; Charles B. Shanks, San Francisco.

Sheboygan, Wis.—E. H. Rummele and Alfred Schmidt, proprietors of the Rummele Automobile Co., have dissolved partnership and the business will be continued by Mr. Rummele.

Washington, D. C.—Wine & Benson, agents for the Premier, have added the Abbott-Detroit to their line. They have recently taken possession of their new salesrooms at 1312 Fourteenth street N. W.

St. Paul, Minn.—John Wharry and T. C. Borg have bought the interest of Burney Bird in the Burney Bird Auto Co. and will conduct the business under the old name. The Haynes, Mitchell and Hupmobile will be handled.

Mishawaka, Ind.—Ground has been broken for a new garage at 1109 North Main street by George C. Clark, who has just taken the agency for the Chalmers. The garage will be of brick, 60 feet deep, and a frontage of 35 feet.

Watertown, Wis.—The Copeland-Roach Motor Co. has been appointed district agent for the Michigan 30. The company has recently installed a large portable electric air compressor in its big garage on First street, near Main street.

Davenport, Ia.—The Greater Davenport Auto Co. is the latest to enter the field and is handling the McFarlan six. The members of the firm are P. W. Reck and W. R. Waters, and the garage and machine shop are located in East Davenport.

Kalamazoo, Mich.—The Kalamazoo Motor Co., formerly located at 116 West Fuller street, has moved to new quarters at 118 North Edwards street. Hereafter the company will be known as the Kalamazoo Auto Sales Co. Albert E. Rose is president of the concern and Thomas Orrell manager.

Milwaukee, Wis.—The Smith-Hoppe Auto Co. has been chartered by the state of Wisconsin. The authorized capitalization is $15,000, and the incorporators are Jesse A. Smith, Adolph C. Hoppe and C. C. Russell. The company is distributor of the Oldsmobile and Hupp-Yeats lines and has temporary headquarters in the Colby-Abbot building, Mason and Milwaukee streets.

Los Angeles, Cal.—The Standard Motor Car Co., long represented in Los Angeles by Roger Stearns, has taken over the Stoddard-Dayton cars for the entire Pacific coast and also has secured the present building of the Stoddard-Dayton at Tenth and Olive streets, together with all the stock and equipment. Stearns will give up the Ford and Velie cars at the end of his contract, which will be September 30, when the Ford Motor Co. will open branch houses in Los Angeles and San Francisco.

Recent Motor Incorporations

Indianapolis, Ind.—Morton Place Automobile Co.; capital, $10,000; to deal in motor cars and operate a garage; incorporator, M. E. Hutchison.

Evansville, Ind.—Eclipse Clutch Co.; capital, $100,000; to manufacture and sell clutches; incorporator, A. L. Swanson.

Richmond, Ind.—Wayne Works; capital, $150,000; to manufacture and sell wagons, buggies and motor cars; incorporator, E. B. Clements.

Philadelphia, Pa.—Automobile Service Co.; capital, $15,000; to manufacture and deal in motor cars, accessories and conduct a general garage business; incorporators, Robert C. Kelly, Jesse W. Carter and Harry V. Elliott.

New York—Bernston Spring Wheel Co., Augusta; capital, $2,000,000; to manufacture, sell, buy and deal in wheels for motor cars, etc.; incorporators, E. M. Leavitt, of Augusta.

Buffalo, N. Y.—McCue Co., Buffalo; capital, $700,000; to manufacture electric, gasoline and steam vehicles; incorporators, J. Willard Lansing, Buffalo, N. Y.; Ira T. Gleason, Buffalo, N. Y.; Bert H. Bean, Buffalo, N. Y.; Chas. T. McCue, Hartford, Conn.; Henry A. Kamman, Buffalo, N. Y.

New York—Brown Speedometer Co.; capital, $200,000; to manufacture and sell speedometers, etc.; incorporators, A. B. La Far, G. R. Cooper, New York city; W. L. Brower, Maplewood, N. J.

New York—Hexter Motor Truck Co.; capital, $10,000; to manufacture motor trucks, cars, etc.; incorporators, Arthur A. Alexander, A. T. Rook, Murice Milimet, all of 51 Chambers street, New York city.

Trenton, N. J.—Auto and Marine Specialty Co.; capital, $50,000; to manufacture the Williams safety crank, specialties, novelties, etc.; incorporators, Curles T. Williams, Jr., H. S. Maddock, Jr., and Frank D. Holmes.

Paterson, N. J.—Eastside Auto Repair Co.; capital, $20,000.

Philadelphia, Pa.—Lane Auto Association, Incorporated, Syracuse; capital, $10,000; to manufacture and deal in motor vehicles and storage; incorporators, Anna L. Lane, Bradley J. Lane, Earl R. Elmer.

Elmira, N. Y.—American Standard Auto-Car Lift Co.; capital, $25,000; to manufacture a device for supporting wheels of motor cars, motor cycles, etc.; incorporators, Ralph Webster, Dr. Merton R. Saefuse, Parker C. Thompson, all of Elmira, N. Y.

Philadelphia, Pa.—Kutz Auto Tire Co.; capital, $1,000,000; to manufacture motor car tires and kindred equipment; incorporators, M. H. Kutz, of Springfield, Mass.; Percy Heap, of Holyoke, Mass., and Morris Friedberg, of New York.

Youngstown, O.—Household Rubber Co.; capital, $10,000; to deal in all kinds of rubber articles, including tires; incorporators, D. G. Armstrong, Harry Svensgaard, E. A. Armstrong, W. C. McKane and H. C. Ditmansen.

Toledo, O.—Parsons Garage and Repair Co.; capital stock, $10,000; to operate a sales agency and garage with a repair department; incorporators, C. W. Parsons, F. J. Lehman, G. B. Morehouse, Mrs. Edith M. Morehouse and F. J. Lehman.

Cleveland, O.—Weaver-Sealand Motor Co.; capital, $30,000; to buy and sell motor cars and deal in parts and accessories; incorporators, O. L. Weaver, F. N. Sealand, Louis Englander, David P. Bonden and Harry Bissell.

Dallas, Texas—Auto and Carriage Supply Co.; capital, $3,000; incorporators, George T. Mahana, Harry Wheatly and M. Zauf.

Toledo, O.—American Motor Truck Delivery Co.; capital, $150,000; to conduct a general trucking business by means of motor trucks, to do a light delivery business and to conduct a sales agency and garage for motor cars of all kinds; incorporators, Dwight Smith, M. D. Neff, E. A. Mallery, C. E. Tucker and Clarence B. Hadden.

Columbus, O.—Eastern Automobile Co.; capital, $20,000; to conduct a sales agency, trade in motor cars and motor cycles and to do repairing on motor cars; incorporators, Jacob Goldstein, J. E. Leacy, F. T. Cain, W. C. Adams and Charles Sylvester.

Toledo, O.—Saxon Mfg. Co.; capital $10,000; to deal in supplies; incorporators, Herman Saxon, Charles G. Cunningham, Richard D. Logan, T. A. Koster, Phyllis Sackett.

Milwaukee, Wis.—A new firm has just been organized in Milwaukee, the Smith-Hoppe Auto Co., with temporary quarters at 116 Macon street.

Columbus, O.—Plans are being prepared by Architects Howell and Thomas for a large brick garage to be erected by Frederick Howald on Broad street, east of Alum creek, Columbus, O.

Fremont, O.—A large addition, 40 by 100 feet, will be erected by the Lauth-Juergens Motor Co., to make room for the increased output. Another addition, 50 by 250 feet, will be started in a few months.

Cleveland, O.—The Abbott-Detroit Sales Co., capital $20,000, will operate a sales agency and conduct a garage. The incorporators are O. D. Eshelman, R. E. Deacon, R. E. McClellan, Ada N. Jackman and F. E. McClellan.

Seattle, Wash.—The establishment of the Everitt Northwest Co., which will be located at 1401 Broadway, is announced. The Everitt heretofore has been handled by the H. O. Harrison Co. The new Everitt branch will include the territory of Washington, Oregon and Idaho. W. D. Wallace of Seattle is general manager; George C. Nichols will be resident manager at Portland and C. W. Dansie will be local manager in Seattle.

Wilmington, Del.—The Gomery-Schwartz Motor Car Co., Inc., with temporary quarters at southeast corner Fifth and Orange streets, is now handling the Hudson.

Quincy, Ill.—The Kurz Machine Co.'s new garage has been established in the new Ireland building at Eleventh and Maine streets. The company handles the Oakland and Everitt.

Cleveland, O.—O. L. Weaver, who has represented the Willys-Overland in eastern Ohio and western Pennsylvania for a number of years, and Frank N. Sealand, who has been connected with the Winton company's sales department in Cleveland for 6 years, have incorporated the Weaver-Sealand Motor Co. and have contracted for the sale of the Pierce-Arrow and Everitt lines in northeastern Ohio.

Akron, O.—Permits have been granted to the Diamond Rubber Co., of Akron, O., for the erection of two buildings, to cost $25,000, for the enlargement of its plant. One of the structures will be 40 by 180 feet and two stories high, and will be used for a mill room. The other structure will be 185 by 114 feet and will be used as a calendar room. Both buildings will be built of brick with steel construction.

The Motor Car Repair Shop

THERE is nothing more scientific than the proper application of heat to produce certain results; and in the motor car repair shop, as in practically all mechanical operations, its common uses are many. Advantages of heat treatment are not generally known among amateur and junior repair men and a few hints on its powers of expanding metals might be appreciated.

In Figs. 1 and 2 two illustrations are given to show how, in one case, the proper application of heat was successfully employed in loosening a valve cap which would not be opened by a wrench alone.

The cylinders shown are supposed to represent Pierce-Arrow cylinders, and instead of simply having the top portions of the caps screwed in lightly and the lower portion or disks clamped tightly down upon their seats by the stud which pierces the center of the upper portions, the upper portions had been screwed tightly down upon the disks, so that when it became necessary to grind the valves, the valve caps could not be removed. The valve cap construction is shown in section just above and to the right of Fig. 1.

Before applying heat to the top of the cylinder around the valve cap, an effort was made to remove the cap by means of a wrench and cold chisel as shown in Fig. 2, but the cap would not budge. Next the blow torch was played upon the cylinder as indicated by Fig. 1, while an effort was made, at the same time, to loosen the top portion of the cap with the wrench, as indicated. Even this failed to move the cap. The wrench then was removed temporarily, a steady flame played around the top of the cylinder for a few minutes; then a little cold water was poured on the cap to shrink it. As soon as the water stopped boiling, the wrench was applied again, a strain put upon it, and with a few well directed sharp blows of the hammer on the chisel whose nose was sunk into the cap near its periphery, it was loosened.

This is just one of the many ways in which heat may be employed in loosening parts of motor cars that cannot be readily removed otherwise. A case is recalled where two or three good amateur repair men worked steadily for 12 hours removing and replacing a flywheel with makeshift wheel pullers, etc., where, had an expert been on the job considerable labor might have been saved by simply heating and expanding the hub of the flywheel.

Hurry-Up Repairs

It often happens that a disabled car is pulled into the repair shop with instructions from the driver to hurry and patch it up temporarily so that he can get home with as little delay as possible. Such a hurry-up job amounts to a roadside repair, except in the matter of a better equipment of tools, especially if the repair man does not have on hand replacements for the damaged parts.

Quite frequently, for instance, a case of this kind comes up when the carbureter is in trouble. The float may be jammed down on its seat, or leaky or fuel soaked, or the needle valve stem bent. To remedy this sort of trouble in a hurry, take out the float. An examination of the latter will disclose whether it is at fault in any of the ways mentioned, all of which are easy to fix. If it is found that the float was jammed down, maybe by too strenuous priming, the mere act of taking it out will cure the trouble, provided that the needle valve or its seat is not injured or the stem is not bent. If the seat has been scored it must be ground just like any other valve.

If the float is of cork and has become fuel-soaked, the next best thing to throwing it away and putting in a new one is to move it up on the stem so that it sets higher in the gasoline. When a metal float is punctured or the solder is loosened of course it should be soldered. If there is not time for this and the puncture is on the bottom, inverting the float so that the hole is on the top will often allow the car to run home. A kink that has proven successful as a last resort is to fill up the float with something that will increase its weight and put under it a short piece of coil spring. With care it can be balanced so that the action will be the same as with a float in good condition. If the carbureter is designed to open the needle valve when the float sinks, the spring may be placed at the top.

Such makeshifts are not to be recommended for every-day practice in the repair shop and should only be resorted to as a temporary repair where a permanent remedy would be out of the question.

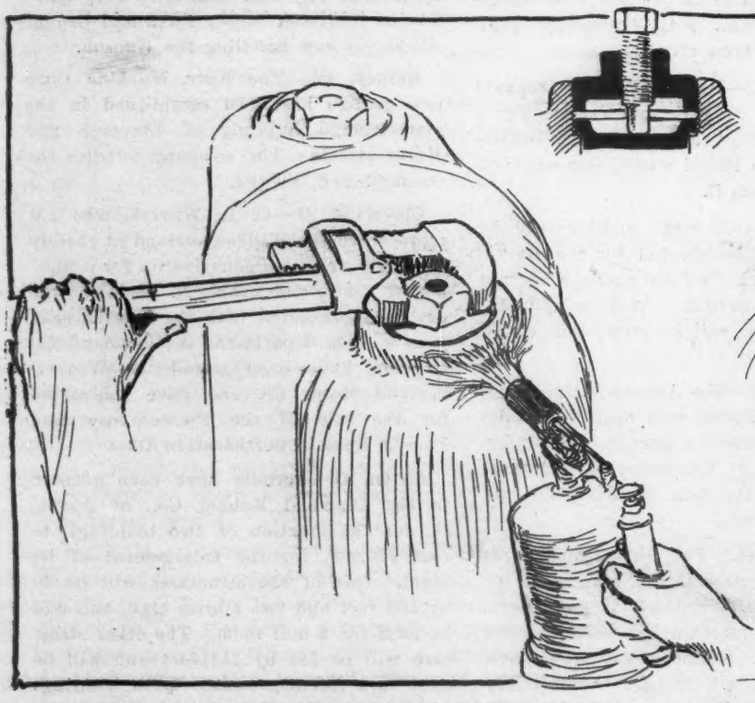


FIG. 1—APPLYING HEAT TO CYLINDER TO LOOSEN THE VALVE CAP

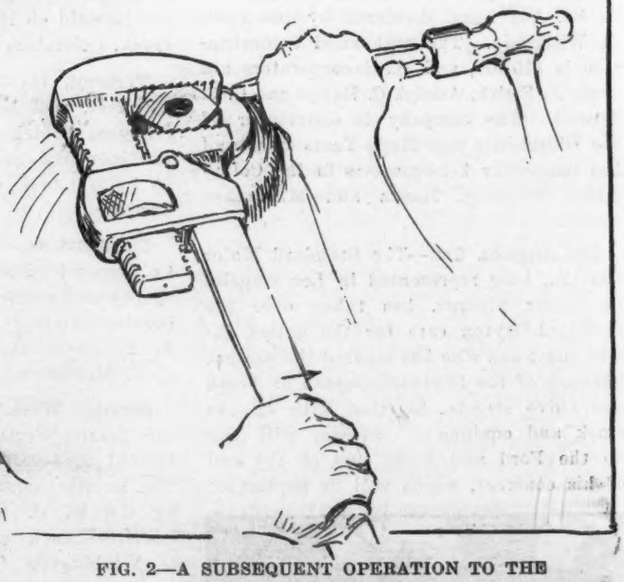


FIG. 2—A SUBSEQUENT OPERATION TO THE APPLICATION OF HEAT

FOREWORD

IN THE eyes of parents most children are faultless—as nearly perfect as it is possible for the human being to approach. In lesser degree, perhaps, each man views his own inanimate handiwork.

As the producer of mechanical appliances gazes over the product of his brain and brawn he naturally feels that his material must be a trifle superior to anything else produced. It is this feeling of confidence and enthusiasm that inspires the vast improvements recorded daily by the progressive makers in every manufacturing line.

It is but natural that the Willys-Overland Company, rising from the depths of obscurity to the heights of greatest prominence in four short years, should feel justly proud of its attainments—confident of the superiority of its product and the future of its business. But just how to tell the cause of this unprecedented success to the general public without danger of appearing too boastful or egotistical was somewhat of a problem.

After a great deal of deliberation, we came to the conclusion that it were better to have the story told by someone entirely without the fold of the Overland Company, to be told by someone who might perhaps see points of excellence or points of demerit which would escape the eye of those in the company, who are naturally in daily touch with everything that is going on in the plant itself. For this reason we obtained the services of a man thoroughly familiar with the automobile industry in its every phase, a man who has run the gamut of manufacturing, selling and advertising, a man who is able to go into any corner of the 80 odd acres of floor space and be thoroughly and technically familiar with whatever operation may be in progress. To this man we said, "We want to tell the American public the story of an automobile as exemplified in the Overland factory. We want you to go into our plant and gather every detail essential to the telling of such story; and then we want you to tell that story as you see it in simple language." The story follows:

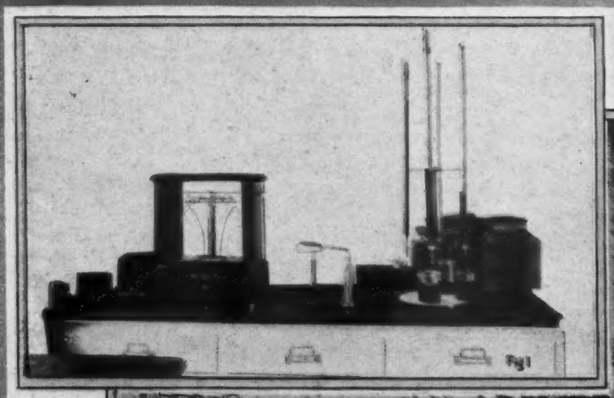
J. N. Willys

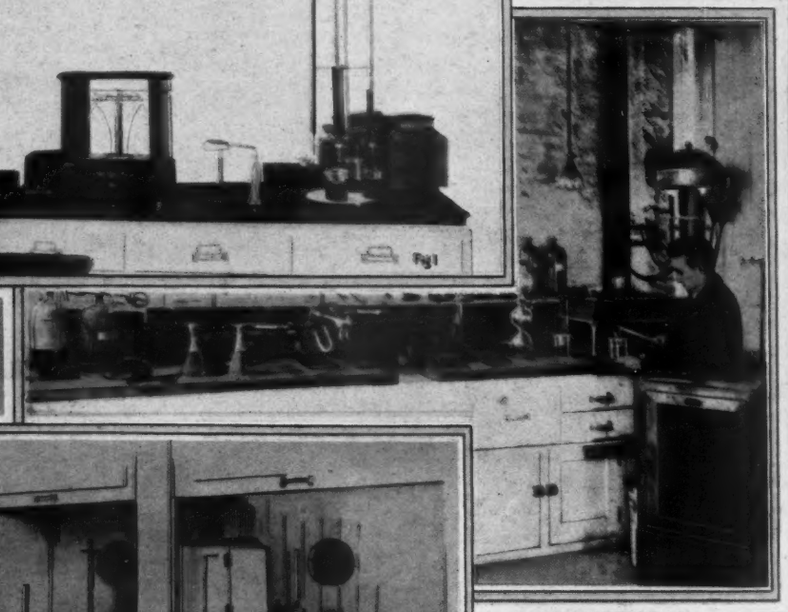
In the birth of the automobile all kingdoms of the earth combine—animal, vegetable and mineral. From the animal kingdom come the leather, hides and coloring pigments. From the vegetable kingdom come the woods, oils and rubber. From the mineral kingdom come the ores, and their resultant metals. And again, from the animal kingdom, the brain and muscles which mold these rough materials into the finished product.

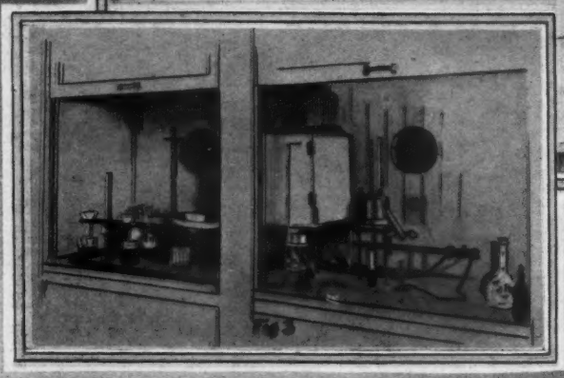
With nothing smaller than the mighty world to draw from, and with the necessity of some one master mind being familiar with the transformation of all these raw products into the finished article, it is easy to see that the man who dictates the making and selling of an automobile must truly be a man of wonderful breadth and attainment. He must know market conditions throughout the world. He must know manufacturing conditions in detail, not only in his own plant, but in the plants of the world. He must know selling conditions wherever his product is offered, and above all, he must know men. Such man is John N. Willys.

"I will" and "Economy of production and overhead" are the keynotes of success reflected from Mr. Willys throughout the Overland plant. No man in his vast organization of between five and six thousand has ever been known to say "I will try," or if he has, his place has been filled by another who, in keeping with the spirit of the plant, always says in answer to every problem, "I will."

This story is not a eulogy on John N. Willys, but it is absolutely essential that the reader understand this personality to realize fully the character and standard of the products which he controls.







Naturally then the first place to visit in a trip through the Overland plant is the chemical laboratory. To the layman who enters this room for the first time there is little on the surface of apparent interest. He sees a lot of bowls, glass bottles, crude earthen crucibles, jugs and other implements of the craft lying around promiscuously. But as he talks with the alert chemist he learns of the details to which this department goes to insure safe, satisfactory operation of the car by insisting upon proper raw material being furnished.

There was a time when this chemist threw out thousands of dollars' worth of stock which was not up to the standard. Now that seldom occurs, for manufacturers of raw stock know that when they ship to the Overland Company they must send stock up to specifications in every way.

IT would matter little what care and attention were paid to the detail of the manufacture, if the rough stock which enters into the car were not up to the standard demanded by the engineer and designer of the car. An automobile is first made on paper through the combined efforts of the designer and engineer. These men know how large a piece of steel must be to carry a given strain, provided that steel be composed of certain percentages of basic metals. So when they make their calculations they base them upon a steel with a certain percentage of manganese, vanadium, nickel, carbon and other elements. They know that a certain portion of carbon, together with a certain portion of vanadium, will produce a steel that will stand certain strains. They also know that if the proportion of the vanadium varies even so much as a fraction of 1% that the steel will be either too weak or too brittle. This applies to every piece of metal used in the manufacture of a car. So when raw stock of any sort is sent to the plant, before it is worked up there must be every assurance that its chemical constituency is in accordance with the specifications furnished by the engineering department. For in this business, as in many others, every safeguard must be taken to prevent substitutions. This being true, one of the most important details from the standpoint of the consumer in the manufacture of a car is the assurance that the materials that enter into it are up to the standard of the manufacturer.

Page 4

Fig. 1. Scale at left measures accurately to fifteen ten thousandths of a grain. Specific gravity balance in center determines accurately to one ten thousandth.

Fig. 2. Schimer Combustion Crucible for carbon determination.

Fig. 3. Fume closet. Smaller instrument to the right supported on three legs is a viscosimeter. The outlet at the bottom is made of agate, drilled by a hair drill. The amount of oil that comes out of this hole in relation to the amount of water that comes out of the same hole in a specified time is the standard of the viscosity measurement upon which the oil is based.

Page 5

Fig. 1. Oil testing machine.
Fig. 2. Spring testing machine.
Fig. 3. Endurance testing machine
Fig. 4. Tensile strength testing machine.
Fig. 5. File testing machine.
Fig. 6. Torsion testing machine.
Fig. 7. Impact testing machine.

FULLY as important as the chemical laboratory and working in close harmony with it to assure raw stock entirely up to specifications, is the physical testing laboratory located in the new engineering building.

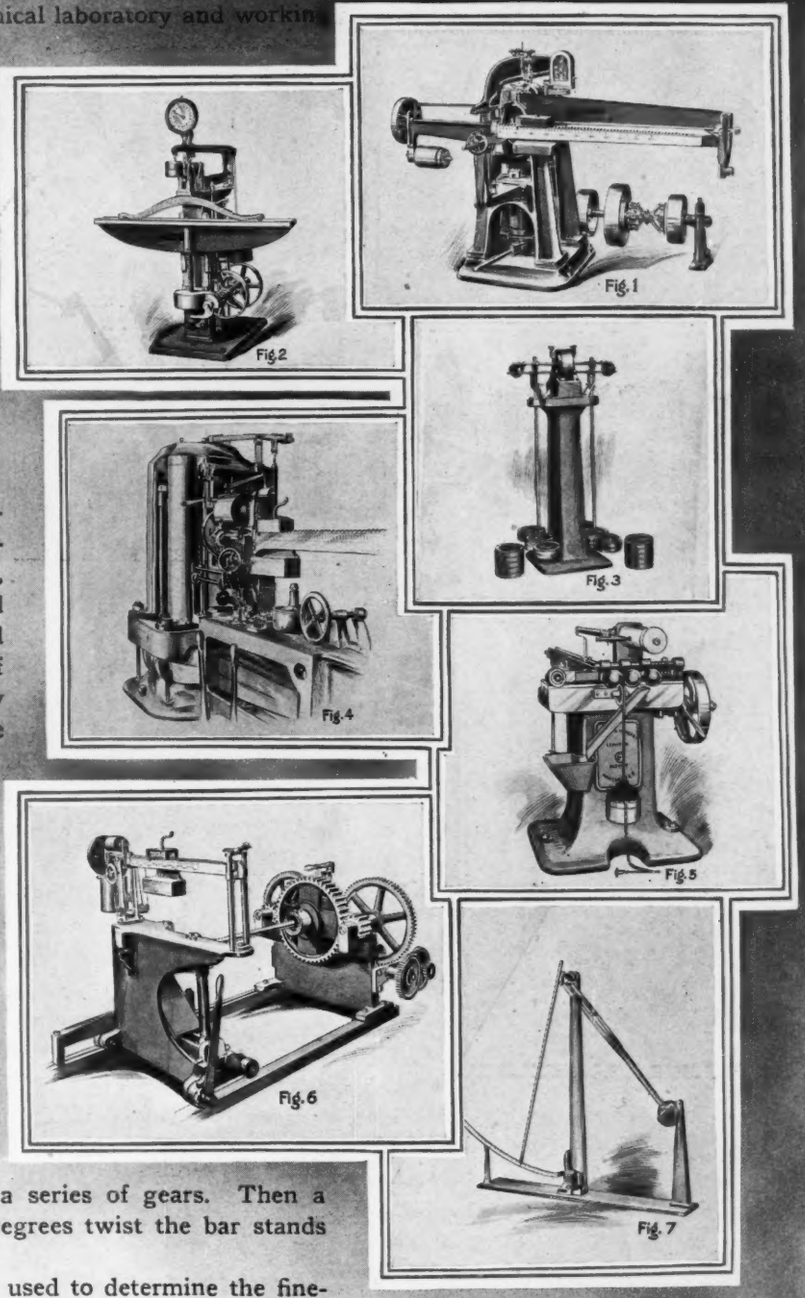
There is probably no factory in any industry in the country more thoroughly equipped with up-to-date apparatus for the determination of the physical properties of raw stock than that of the Willys-Overland Company.

Here you will find an Olsen tensile strength testing machine of 100,000 pounds capacity.

Then there is one of the latest improved White-Souther endurance testing machines. To utilize this machine, the bar of metal to be tested is revolved at terrific speed with certain fixed weights suspended from either end of the bar. Then a record is made of how many revolutions the bar makes before it succumbs or breaks down under the pressure of the weights.

The Olsen spring testing machine is of a capacity of 6,000 pounds. The spring to be tested is placed under this machine and vibrated very rapidly. Then a record is made of the number of million vibrations the spring makes up and down before it breaks down or takes a permanent set.

The torsion testing machine is also an Olsen device. With one end of the bar to be tested permanently fastened so as not to move, the other end of the bar is twisted around by a series of gears. Then a calculation is made as to how many degrees twist the bar stands before it finally breaks.



Then there is a file testing machine, used to determine the fineness of files bought for the various departments — an impact tester, which shows how heavy blows per square inch the different metals will stand before breaking down — an oil testing machine that demonstrates the qualities of various oils by their ability to reduce friction losses, and a dynamometer of 100 horse power capacity at 2500 revolutions per minute. This dynamometer is one of the latest Sprague outfits and is perhaps the most up-to-date and complete machine for determination of power ever produced.

This dynamometer is the determinor of all the features of the power plant. It shows not only how much power the engine will develop at the variable speeds but also how to make the power curve uniform from one variation to the other. In other words, an engine may develop a fine power showing at low speed or intermediate and then fall away hopelessly at the high speeds. Or the reverse may be the case. Or still again the motor may attain a good power showing and then drop off in a very few seconds. All these performances are watched and recorded carefully. Then the engineer takes these records and makes his deductions therefrom. Perhaps the valves are too large in proportion to the engine capacity, or maybe they are too small. Maybe they open too much—or too little. All these things are apparent to the engineer as he studies the dynamometer readings, and he makes his corrections in accordance. When the dynamometer test shows a perfect reading then every motor of that model must develop power in accordance.

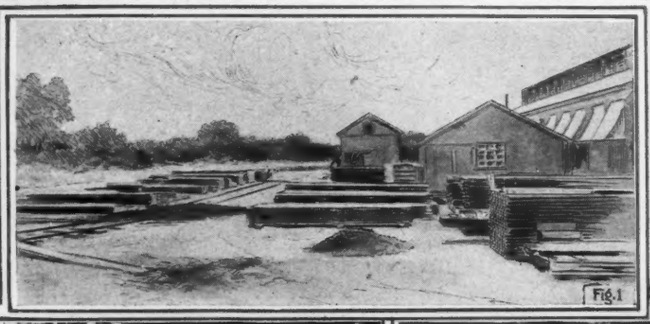


Fig. 1

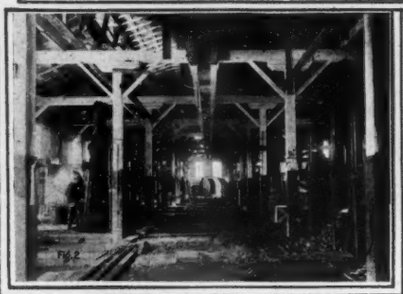


Fig. 2

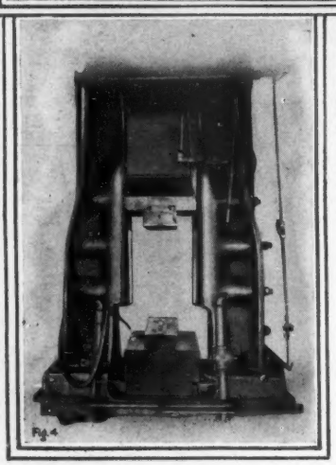


Fig. 4

IN the drop forge department is the real beginning of the manufacture of the most important metal parts of an automobile. In this department occurs the first treatment of the raw material which is finally turned into the crank shafts, cam shafts, gears, connecting rods, axles and the other smaller parts.

Drop forgings are pieces of steel hammered under terrific pressure and at a proper temperature into rough likenesses of the finished part as can be seen by glancing over Fig. 5. The operation is the same on all parts, varying only in detail. Such description as is given here of a crank shaft is typical of everything that is done in the drop forge department.

First a bar of steel very much larger than the finished crank shaft is heated to the proper temperature, which has been determined by years of study and research. The bar is laid over a breaking down die in the bed of one of the ponderous hammers and several blows are struck, which finally shape the crank shaft, as shown in Fig. 5-B. Then the operator, with a pair of huge tongs, lifts it over from the breaking down die to the finishing die, which is made perfectly accurate as to size and shape. Then this hammer, which is operated by steam, pounds the hot steel into the die, striking it first on one side and then on the other, as the operator switches the metal about, until the forging assumes the shape of Fig. 5-C. The forging is next taken to a trimming press, and, as the mechanic terms the operation, its "whiskers are trimmed," so that the forging looks as shown in Fig. 5-D.

At this point of the operation the bar is correct in size and shape for the machining and milling of the bearing surfaces. The next operation is to provide for the flange upon which the fly wheel is subsequently attached. This is done by what is called an upsetter, which is a machine operating horizontally instead of vertically. It simply presses the flange, as shown in Fig. 5-F, out of the collar of metal that has not as yet been hammered in the former operations on the steel bar.

The ability of the Overland Company to operate so extensive a drop forge plant helps materially in keeping down the cost of production. The greatest item of expense in drop forging is the bringing of the raw stock to the proper temperature for hammering. In smaller plants, where the hammers are few and far between, it is necessary to change the dies after each operation. This means that the breaking down operation is completed on an entire batch of work, which, of course, cools off. Then the dies are changed and the stock, after being heated again, goes through the next operation. In the Overland plant each die has its own hammer, so that with one heating the rough bar is hammered into the finished product.

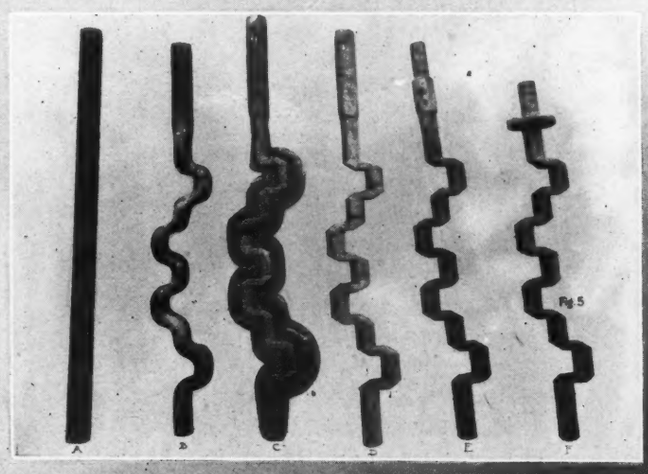


Fig. 5

If you are a lover of human interest stories, or incidents, do not overlook the opportunity of visiting a drop forge plant. Common belief is that the only hazardous occupation in connection with the automobile industry is the driving of a racing car, but without having any statistics to back up the statement, the assertion is ventured here that almost as large a percentage of fatali-

ties occur in drop forge shops as in automobile races. It is a most hazardous occupation, and the men who follow it do not stay with it very long. In the first place, it requires men of giant strength and constitution. They are called upon to handle enormous weights under the most awkward conditions, and always in danger of being bruised or suffering broken bones should anything go wrong.

In addition to this, the operator of a drop forging hammer must be a man of keen eye, quick brain, and good judgment. Every once in a while one of these heavy hot forgings will stick to the hammer and go flying up into the air with the operator hanging on to it like grim death, tugging and pulling to disengage the hot metal from the hammer itself and get it back on to the die before the ponderous weight shall have descended again with its crushing force. In those moments the act must be quicker than the thought.

After the steel bars have been thoroughly hammered into the dies, they are sent to the heat treating department, where they undergo the final preparation for the machining, milling and grinding department.

When the drop forging comes from the forge in its rough shape it is in no condition to be used, because of internal strains, which the hammering has produced. In bending a bar of solid steel, notwithstanding the fact that the bar retains its bent condition after the pressure is removed, there is always present the tendency in the core or center of the bar to fly back to its original condition. This same is true in a drop forging. To overcome this, heat treating is necessary.

The same amount of care is taken in the handling of metals under this treatment as in the manufacture of steel. Years of experience have taught the men who handle this operation just the proper heat and just the proper cooling that is required to produce the correct physical condition of the metal. After the steel has been brought and held to the certain temperature for the right length of time, it is cooled in water or oil, as the requirements may indicate.

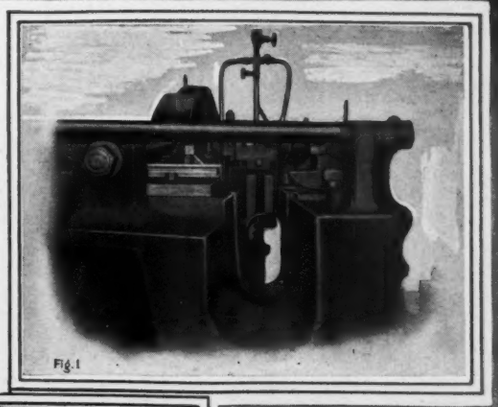


Fig.1

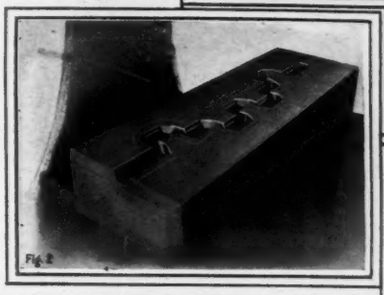


Fig.2

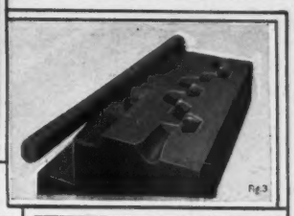


Fig.3

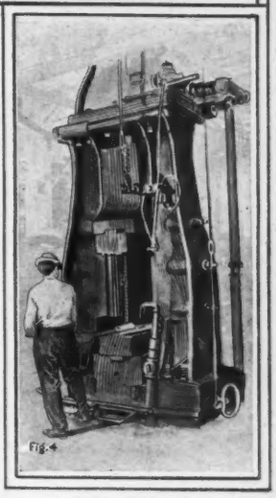


Fig.4

Page 6

Fig. 1.—General view of rough stock showing piles of iron bars and rods.

Fig. 2.—Interior view of drop forge shop.

Fig. 3.—Interior view of shower bath and wash room for use of drop forge shop employees.

Fig. 4.—One of the enormous drop forge hammers equipped with die.

Fig. 5.—Various stages of rough bar of steel being hammered into crank shaft forging.

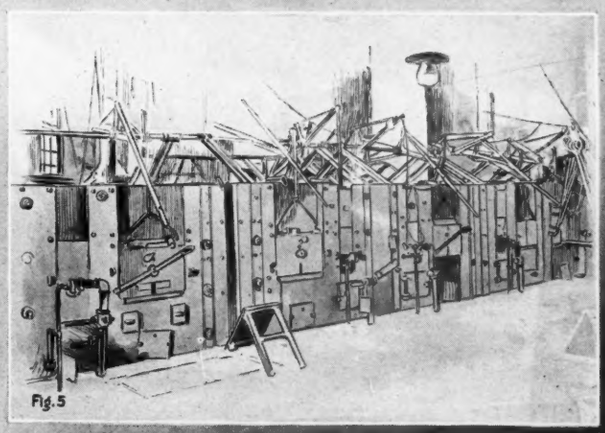


Fig.5

Page 7

Fig. 1.—An upsettor used for pressing flange on crank shaft.

Fig. 2.—Crank shaft finishing die.

Fig 3.—Crank shaft breaking down die and finishing die. Breaking down die is in left of cut and resting upon it is a bar of steel. Finishing die is right hand side of cut.

Fig. 4.—Drop forge hammer working on front axle forging.

Fig. 5.—Part of heat treating furnaces.

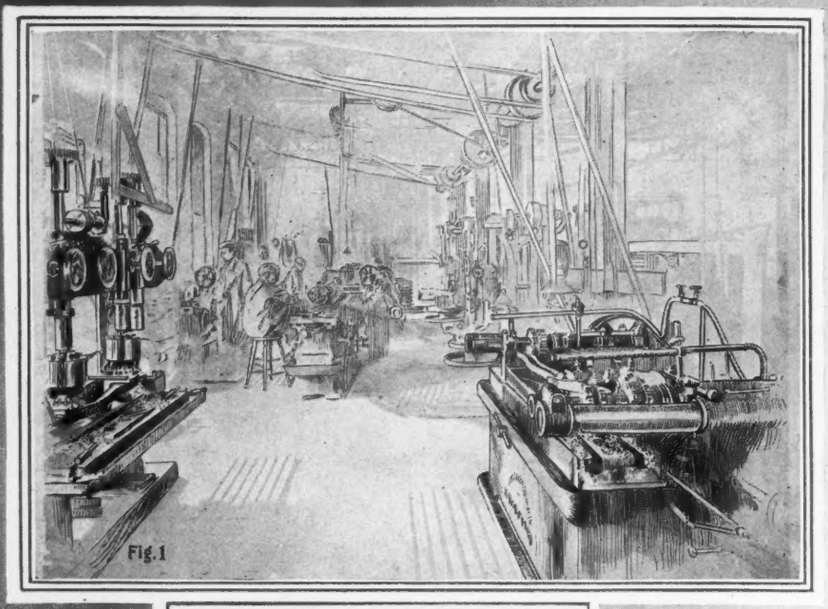


Fig. 1

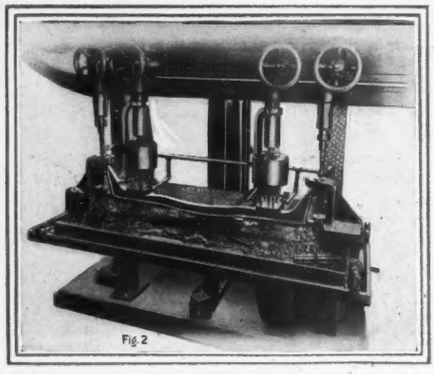


Fig. 2

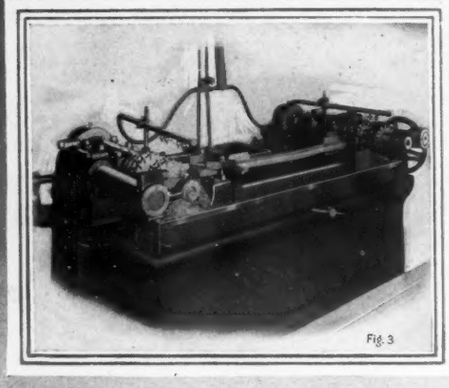


Fig. 3

WHEN the crank shafts are ready to leave the heat treating department they have been forged into shape, centered at both ends and straightened. In this condition they are brought to a lathe room and one main bearing and one line end are turned up. The main bearings are the bearings of the crank shaft all in a straight line, which rest on the main bearing of the crank case. The throws are overhung parts, which are connected to the connecting rods of the engine. After the one main bearing and end bearing are turned and trued, the shaft moves on to the next workman, who rough turns the flange, then the next man smoothes up the inner surface of the flange, which is called "facing the cheek," and rough turns two end line bearings. Then the crank shaft is cut off to the right length, and recentered so as to fit accurately into the lathe. The next operation is the proper spacing, and facing of the cheeks on the throws; next comes the facing of the cheeks on the main bearings, and also the rough turning of the remaining three line bearings. Then the other bearings are turned down to within 14 hundredths of an inch of the final size required, and the crank shaft passes on for the rough grinding of the throws. The next man with a very fine grinding machine finishes the grinding on the throws to one thousandth of an inch. The main bearings are rough ground again and then finally the rough main bearings are given the finish grinding, giving a complete crank shaft ready for the inspection department. After the crank shafts have been inspected, they are sent to the lathe department for final treatment, which will be discussed later.

In the wet grind department the piston pins and cam shafts are also treated. After they come down to the wet grind room, the cam shafts are first accurately straightened, then all of the bearings ground to finish. The center bearing is ground to a limit of five ten-thousandths of an inch, while the two end bearings, the timing gear bearings and the timing cam bearings, are ground to absolute measure. There is no variation

Fig. 1.—Shows a general view of the special front axle machine department at one end of the wet grind room. The machine at the extreme left of this figure is the multiple drilling machine which bores all the holes in the front axle at one operation. The machine at the extreme right is the milling machine which mills all the pads at one operation on both ends of the axle.

Fig. 2.—Shows the drilling machine at closer view. This gives a good idea of the method of drilling all the holes at one time.

Fig. 3.—Is a close view of the special front axle milling machine showing an axle in place and machine milling off the pads at either end.

at all — not even one thousandth or one-half thousandth of an inch.

All the time these various operations are in progress, the workmen are continuously using micrometers and special jigs to insure absolute accuracy in the work. After each operation is completed each piece is carefully micrometered and thoroughly inspected before passing on to the next step.

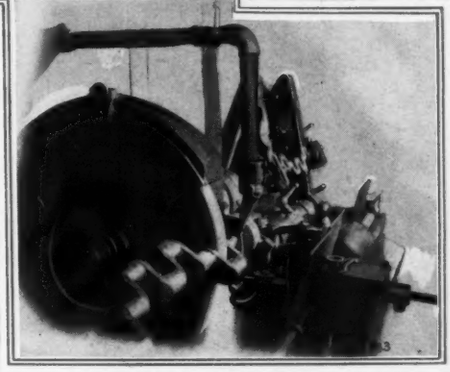
The front axles come to the special front axle machine department in somewhat rough shape from the forge, and in three separate operations they are turned out a finished product. First the pads are milled so as to make flat, true surfaces for the spindle bearings. Then the axle is placed in a specially prepared jig, and twelve holes in the end and spring pads are drilled at one operation, and by one machine. In the same fixture holes for the spindle bolts are finish reamed to five ten-thousandths of an inch. The third operation is the facing, as it is called, and counter boring of the holes already drilled in.

All the grinding that is done is absolutely as perfect and smooth as it is possible for machines measured to thousandths of an inch accuracy to produce. This precaution prevents the cutting of the opposite bearings when the parts are assembled, and makes for long life and quiet performance.

It must be remembered that these steel pieces are all hard and that they revolve in soft metal bearings. So, if there is the slightest deviation from proper size or shape, or if there be the slightest roughness or imperfection in their surfaces, it is only the question of a short time until the bearings wear rough, noise develops and life grows short.

Fig.1

Fig.2



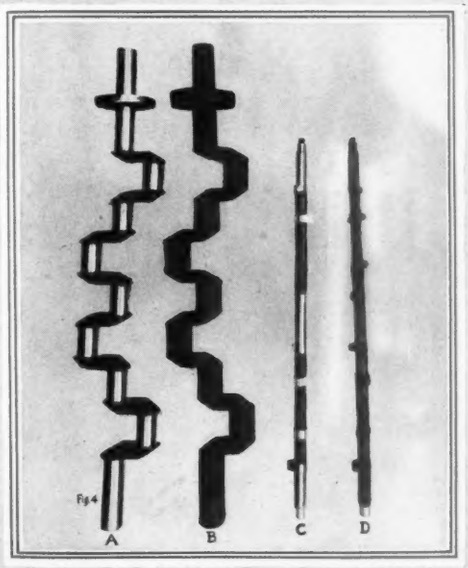


Fig. 1.—Shows the first work in the wet grind room done on the cam shaft. These men straighten the cam shafts before they are put into the grinding machines. If they are badly out of line the tool in the center is used to straighten them. The ends are held fast and then this tool is screwed down at the point where the bend occurs and pressure applied until the shaft is straight.

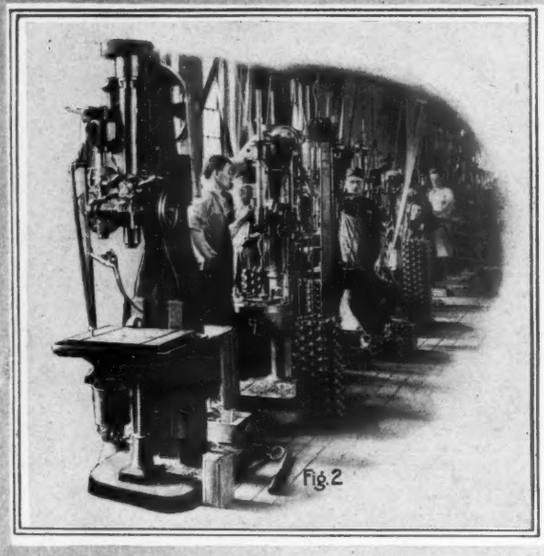
Fig. 2.—Shows one of the operations of grinding a crank shaft. Notice the enormous amount of water which contains a lubricant, used to prevent the steel from burning.

Fig. 3.—Shows a grinding operation on a crank shaft with the water turned off. Notice the flame of sparks underneath the bearing which is being ground.

Fig. 4.—"A" shows a crank shaft after it has been finish ground. "B" shows the rough crank shaft before being ground. "C" shows a finished cam shaft, while "D" shows the cam shaft in the rough.

IN the lathe department the crank shafts are given their final machine treatment. The flange is turned down in diameter to size never varying more than one-half thousandth of an inch. The end is turned down to take the clutch cone, and the hub of the crank shaft gear and fan pulley are also machined to size.

In the milling and drilling room the key seat (which is a slot or opening in the shaft at one end, and provides by means of a wedge for locking in a fixed position) is milled in both the crank shaft and cam shaft. It will be noted that up to this time practically all that has been done, excepting in the instance of the front axle, has been to grind the bearings to the right size and to straighten up the parts.



Now we come to a department where the work of making threads and milling is done. In this department are also found the connecting rods, the cross members of the frame and helical timing gears. The connecting rods return to this room from the forge. First the end which goes on the crank shaft is drilled, reamed out and spaced, so as to take the bearing. Then it is straightened, and the smaller end, known as the piston pin end, which fits up inside of the piston, is drilled and reamed to take the bushing, which in turn fits around the piston pin. Then the various holes are drilled in and tapped or threaded.

Next the bushing, as shown in one of the photographs, is forced into place, and the oil grooves are cut. It will be noticed that the crank shaft end is forged and machined in a solid piece, so as to make it perfectly round. Then, as shown in another illustration, after the machine work is finished, the connecting rods are screwed tightly into a fixture and placed on a milling machine, which cuts the crank shaft end of the connecting rods into two pieces to permit the assembly of the connecting rod around the crank shaft. This completes the operations on the connecting rod, as far as the machine work is concerned.

They are then inspected, the rough burrs on the outside filed off and sent to the completed stock room.

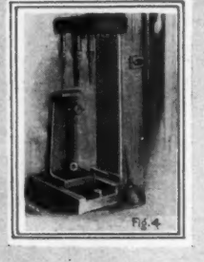


Fig. 1.—General view in one corner of the lathe room. In the foreground and on the left the mechanics are working on torsion tube yokes, a number of which are shown in the push cart.

Fig. 2.—Bank of drill presses working on connecting rods, stacks of which may be seen alongside of the machines.

Fig. 3.—This shows the method of forcing the bushing into the piston pin end of the connecting rod under enormous leverage.

Fig. 4.—This shows a connecting rod in a fixture preparatory to having the holes for the connecting rod bolts drilled by means of a multiple spindle drill.

THE gears are first turned down from the rough state and then are sent to the special gear cutters, where they are set up in varying numbers, and the teeth cut in.

The work on the cross members consists principally, as shown in the photograph, of milling and machining the pads so that they will fit squarely into the frame and also be square on the engine base.

Fig.1

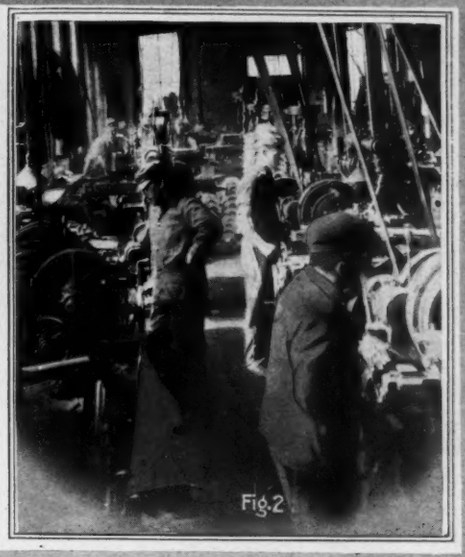


Fig.2

Special attention is called to the fact that cam shafts in all Overland cars are built of one piece, and not simply pinned together, as they are in a great many cases, and which is a much cheaper form of construction.

In factories that do not have the accurate equipment of the Overland plant the danger of spoiling an entire cam shaft by spoiling one single cam is so great that the shafts and cams are all made separately. Then the cams are fastened to the shaft by wedges or other locking devices. This method of construction also unnecessarily adds to the number of parts in the car. It scarcely needs comment that a one piece cam shaft, drop forged and ground to size, is far superior to one of the pinned together sort.

Fig.3

This shows in detail the care that is taken in the working up of rough stock to the finished parts. No attempt has been made to show the work on all of the parts for the reason that it would make tedious reading. The idea has been to present the work as performed on those parts with which the layman is most familiar. There are many other smaller parts, such as valves, lubricating parts, steering gear parts, brake-parts, etc., that go through the same general treatment, and the work on each and every one of them is just as thorough and careful as upon the parts treated in detail above.

So much for the methods of handling the steel and iron parts in detail; and now to a consideration of the methods employed in the handling of aluminum.

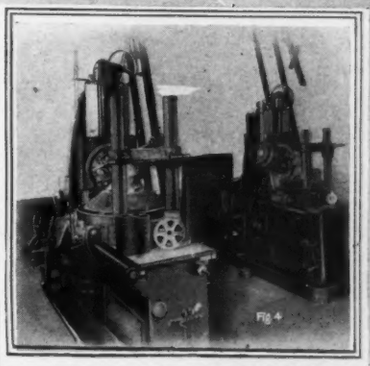


Fig.4

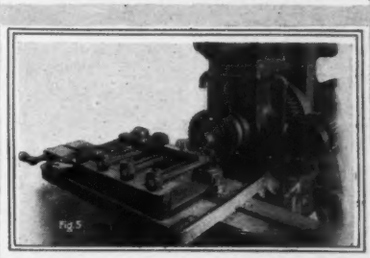


Fig.5

Fig. 1.—Milling machine facing the cross member in one operation, feeding the work vertically against the cutter.

Fig. 2.—Another general view of the corner of the lathe room.

Fig. 3.—Presses used for reaming out the connecting rods.

Fig. 4.—Two of the special gear cutting machines in one corner of the lathe room. The machine on the left cuts the gears dry. The machine on the right cuts the gears wet, that is, with water flowing on the work while the operation is being performed.

Fig. 5.—Shows four connecting rods in a special fixture bolted to the platen on the milling machine slitting the crank shaft ends by means of a saw.

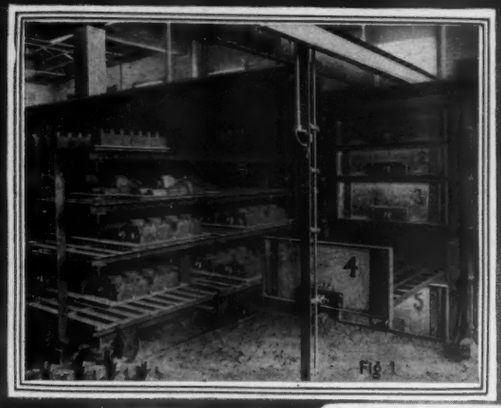


Fig. 1

ALUMINUM is used principally in the manufacture of crank cases, clutch cones, manifolds, and some of the housings, and in a few places where lightness is more to be desired than the extreme strength of the heavier metals. For this reason aluminum work is all casting. After the aluminum has been tested as to pureness, it is sent to the aluminum foundry in the form of ingots, where it is melted up in huge crucibles. In its molten shape it is carried in ladles to the molding room, where it is poured into the various molds. These molds, as is well known, are made out of a composition of earth and glutinous matter shaped around models made of metal. The patterns are then packed, and the metal poured into them, as shown in the accompanying sketches.

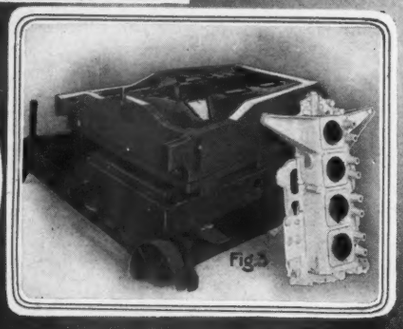


Fig. 3

In the Overland plant, most of the work in the molding room is done with metal patterns instead of wood. Of course the original pattern, which is called the master pattern, is hand made from wood. From this pattern a metal pattern is cast which is used for the work of casting up the parts. The primary cost of metal patterns of course is higher than wooden patterns. But in the ultimate they show a saving and also insure much finer work. So great is the quantity of castings to be made from each pattern that the life of a wooden pattern would be extremely short, whereas a metal pattern naturally lasts almost forever. There is no question but that the metal pattern is much superior to the wooden pattern for continuous use, because it insures absolute accuracy in castings when used in connection with machine casting boxings. By a machine casting box is meant a casting box in which the ramming or packing of the sand around the pattern is done by means of compressed air rather than by hand. In other words, the whole knack of the molder's trade lies in the ramming or packing of the sand around the pattern. This must be done uniformly in all directions or the casting will be irregular in shape.

Fig. 4

Fig. 5

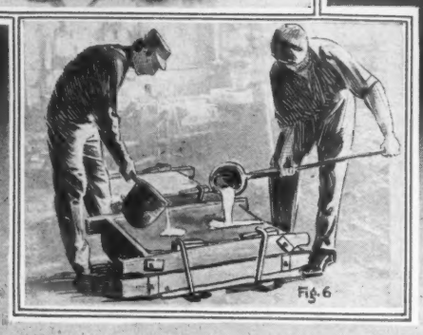


Fig. 6

An automatic machine rammer applies the same pressure in ramming to every grain of sand in the molding box, thus insuring a perfectly shaped casting in every detail. This is just another phase of the Overland determination to insure absolute interchangeability in the broadest sense of the word, for the product which comes from the use of the automatic ramming machine is far superior to that made in factories by hand ramming.

Fig. 1.—An oven in which the patterns are baked.

Fig. 2.—Showing a casting box used for making manifolds.

Fig. 3.—Shows a casting box used for molding aluminum crank case which is shown here standing up against the drag.

Fig. 4.—Molding an aluminum clutch, showing the cope raised away from the drag.

Fig. 5.—Showing a mold after the pattern has been removed with the cope lifted.

Fig. 6.—Shows molders pouring liquid aluminum into the molds.

After the aluminum has been cast to its rough shape it is carried into the heavy machine room, where it is finally made ready for the assembly into the completed car. Owing to the texture of the metal the work in this room is done rapidly and on the basis of great labor saving. The crank case is divided for its handling into three parts, the crank case proper, which forms the top covering of the lower portion of the motor upon which the cylinders rest and through which the push rods work; the oil base, which is the lower half, and the reduction gear covering at the front end where the gears are located.

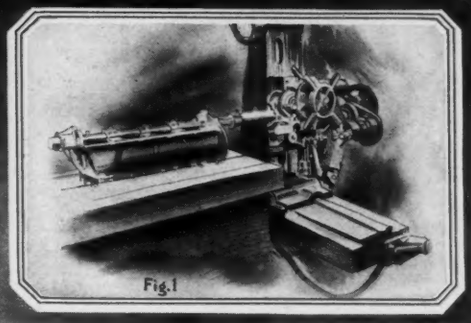


Fig. 1

When the rough crank case comes into the heavy machine room the bottom is first roughly milled, then the tops upon which the cylinders rest are faced and smoothed and the case passed on to a finer machine where the bottom is finished accurately. Then the brackets and push rod tops are milled, and the case is passed on to be drilled. An idea of the real wonderful work which is done in this next operation can be gleaned from the statement that 32 holes are bored at one time in the bottom case, then 21 holes are bored in the crank case at one operation, after which the push rod holes, and some other smaller holes are drilled and spot faced. All this is done in jigs or cluster boxes so that the holes bored are all accurate in relation one to the other to one one-thousandth of an inch. This is one great assurance of absolute interchangeability. This same work is also of great importance in the question of time and labor saving. In many plants these holes are drilled in separately. In comparison with such plants, the Overland Company does this work in one-thirty-second of the time required by the single drilling process. So that in the time the less efficiently equipped plants are turning out one case the Overland turns out thirty-two cases. Then all the holes which take screws are tapped, and the case is passed on for the milling of the gear end. Another fixture and another machine bores the crank shaft and cam shaft holes at one time, and then these holes are faced, and counterbored to an over-all length two-thousandths of an inch tolerance.

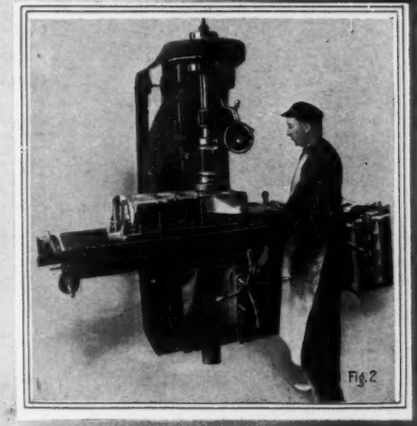


Fig. 2

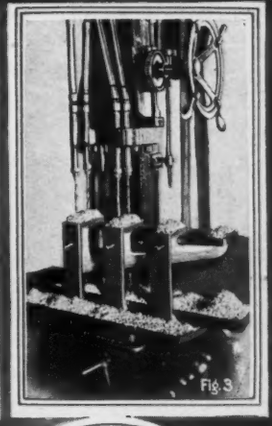


Fig. 3

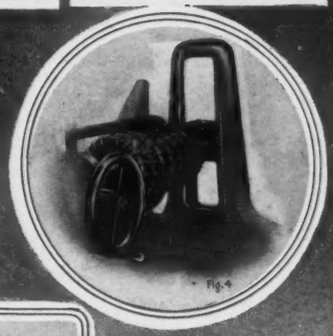


Fig. 4

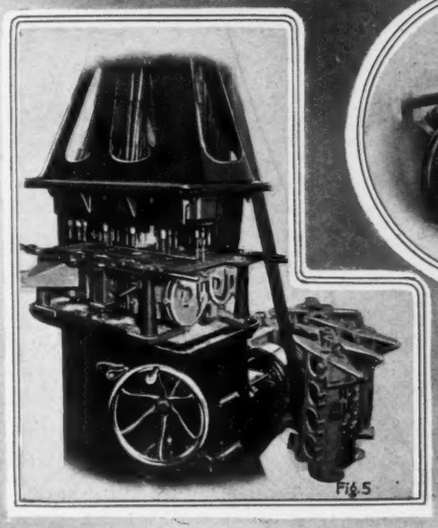


Fig. 5

Fig. 1.—Facing off main bearing on crank case.

Fig. 2.—Facing off aluminum crank case in a vertical mill.

Fig. 3.—Aluminum manifold in angle-plate fixture with flange holes being drilled by multiple spindle drill.

Fig. 4.—Milling cutters facing main bearing boxes in a five bearing crank case at one operation.

Fig. 5.—32 spindle drill boring 32 holes in an aluminum crank case through a special jigging fixture.

The holes are bored out, and the case is sent to what is called the bearing gang mill. This machine, as the name implies, squares up the end facings of all of the bearings at one operation down to one-thousandth of an inch accuracy.

Here is illustrated forcibly the value of positive automatic machinery over work done solely by hand. It would be impossible to perform the functions of this bearing gang mill by any other method. Here an entire case is fitted into a fixture and every bit of cutting must come accurate both in size and its relation to every other part. There is no chance of its coming otherwise, for the design and operation of the machine will not

allow it. If each bearing had to be faced separately or in pairs or by hand it would be mechanically impossible to have the finished product accurate to anything like one-thousandth. For it's almost impossible to work down any one of these faces by hand with a variation of less than this. Then when these variations on each face are multiplied by the number of faces upon which the work is done it is seen readily that there is bound to be a big variation in the completed case. To the layman perhaps the importance of this fine figuring does not appear at first hand. But just consider carefully for a moment the number of parts in a motor. This is one of the basic parts. Suppose a bigger variation than one-thousandth be allowed. Then suppose that same leniency be shown on all the rest of the aluminum parts. Then still again suppose the shafts that run in these cases were allowed to vary more than one-thousandth or from absolute measure as found in many operations. It is plain to be seen that when the parts came to be assembled there would be a grand mess confronting the assemblers. It would absolutely be possible for bearing fits to be an eighth of an inch or more out of true. It would mean loss of time and loss of material as well as an inferior product.

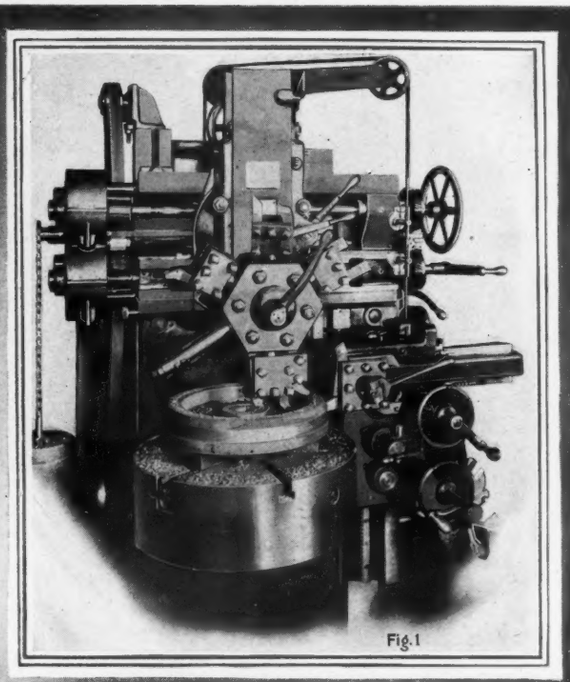


Fig.1

This one citation here carries a big point relative to the lowness of Overland prices. You must have big production to afford the overhead expense of this automatic machinery. You must have this machinery to do work in a class with Overland quality. Therefore the small producer cannot possibly compete with Overland at anything like the Overland prices.

The reduction gear cover goes through a similar operation, although with not as much detail. This also applies to the oil base, which also lacks the detail of the upper part of the crank case.

The oil base is first milled and then sixteen holes are drilled in, after which most of these holes are spot faced. Then two radiuses for the bearing caps are milled, after which the packing groove is milled. Then the screw holes are tapped and the case is ready for final inspection.

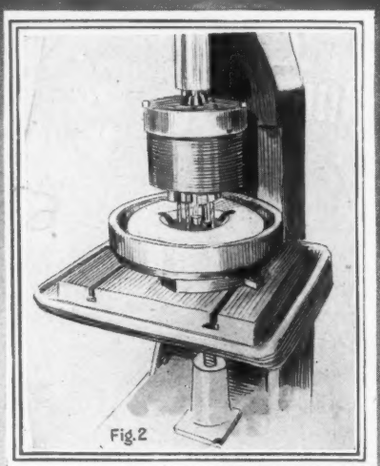


Fig.2

There is one feature of both the reduction gear covers and the oil bases in Overland cars that is well worthy of note. That is the fact that the oil packing channel is cast right into the cases when they are poured into the molds. This is the little groove or channel which carries the packing material that makes the cases oil, dust and water proof. By putting this channel in when the casting is made the danger of not having the opposite channels meet is eliminated and a lot of machine or hand work later on in the handling of the parts is obviated.

Between the various operations on these aluminum parts the cases are placed in a special fixture, which absolutely shows the accuracy of the work previously performed. In other words, if any of the various operations are wrong, or the slightest distance away from accurate measure, this fixture detects the error, and stops further work on the case. So that when the case leaves this room for inspection it is almost a moral certainty that no error will be detected by the inspection department.

In this heavy machine department nearly all the work is upon the aluminum parts, excepting only some cutting and milling on the cast iron fly wheels, and some of the transmission cases.

As will be seen in the photographs, the work on these fly wheels is really remarkable. The operations are few, but the work done is considerable. These fly wheels are finished from the bearings upon which they run down to a limit of tolerance of one-thousandth inch. In fact, the work performed on the fly wheels is just as accurate as that upon the internal parts of the motors themselves.

Fig. 1.—Vertical mill using multiple cutters performing all the operations on a fly wheel simultaneously, with the fly wheel centered from the bearing upon which it runs.

Fig. 2.—Single spindle drill press boring the six flange bolt holes on the fly wheel at one operation, using a cluster box.

MENTION has previously been made of the fact that every operation of every part and every assembly of the parts on an Overland car is constantly being inspected at each stage of its onward course. As a matter of fact, more inspection is given an Overland car during its stages of development from the rough material to the finished product than most cars get from the time they are conceived until they are on the road. But this is only one phase of the Overland inspection—that perhaps is the money saving phase,—for if an error is made on a part in its first stage of development, that error is caught before several of the departments have had a chance to work upon this part, which would ultimately be thrown out by the general inspection department.

Fig. 1

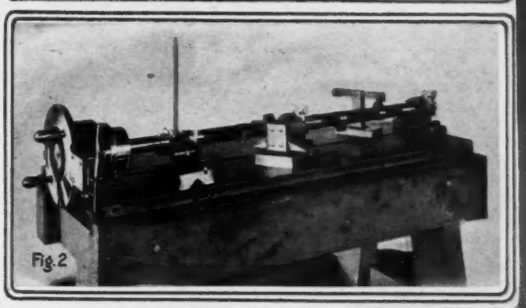


Fig. 2

After the parts are thoroughly completed and machined ready for assembly, they are subjected to an inspection so thorough as to be almost unbelievable. All the important metal pieces are tested to determine the physical properties as to tensile strength, elasticity, hardness, ductility, and also the size, shape, angularity, etc. All of the gears are tested with a special form of equipment, not only as to the dimensions, but also as to bores and centers. Every single cylinder is forced to go through a test with a special form of "go and not go" gauge made in the Overland plant. This gauge determines the precision of the cylinders, and its use assures the absolute interchangeability of every cylinder made. In other words, every cylinder is subjected to inspection during its operation of grinding, and is sent to the inspection department only after having been worked up to practically "no tolerance" limit of variation. Then, with all this preliminary work having been done, the cylinders are fitted up in this special "go and not go" gauge fixture, to be doubly certain they are right. Every single cam shaft is tested out by means of special testing equipment to determine the angularity, shape, and lift of the cam on the cam shaft. Every single shaft must fit accurately over specially designed fixtures. One of the most unique pieces of testing in the whole factory is shown in photographs herewith as being used on a cam shaft, this same operation taking place on the gears, and other hardened parts. This unique process is a determination of the hardness of the metal by the use of an instrument called a scleroscope.

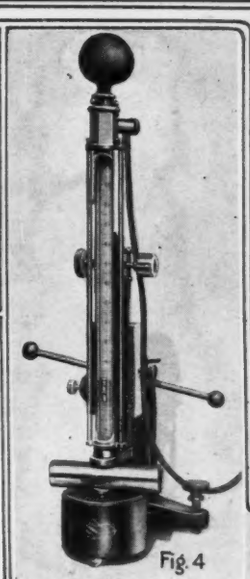


Fig. 4

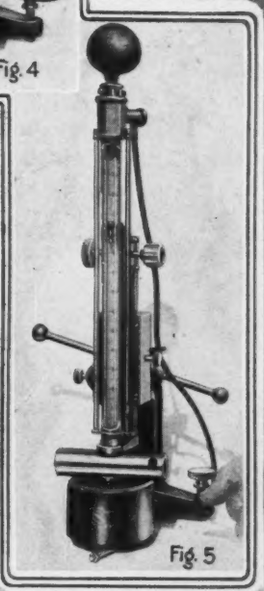


Fig. 5

Fig. 1.—Inspecting crank shaft flange with micrometer.
Fig. 2.—Fixtures for determining shape, lift and angularity of cam shafts.
Fig. 3.—Using scleroscope on cam.
Fig. 4.—Scleroscope showing soft metal.
Fig. 5.—Scleroscope showing hard metal.

In a word, the scleroscope is the check on the heat treating department, in that it determines whether or not the steel has been properly heat treated after coming from the drop forge department.

The principle upon which this scleroscope works is in dropping a miniature tup hammer from a fixed height onto the surface of the material, the hardness of which is to be measured. This hammer, after striking by no other force

Fig. 1

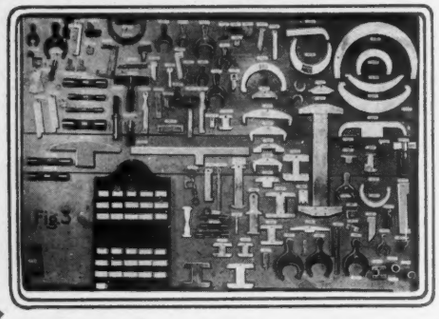


Fig. 3

Fig. 2

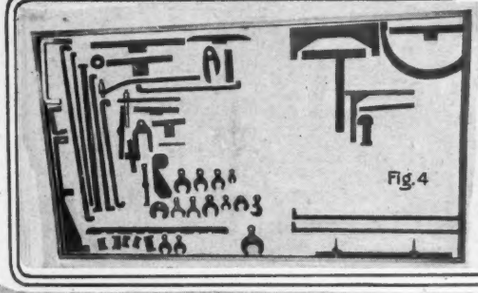


Fig. 4

than its own weight (about 40 grains) momentum, rebounds to variable heights, depending on the hardness or amount of resistance to penetration offered by a metal which will take on a permanent set.

The striking force of this little hammer is over 100 lbs., or 20,000 times the weight of the hammer itself. The area of the point of the hammer which strikes the metal is about 1/2500 part of a square inch and is convex, so that really no more than about one-half of this area comes in contact with the steel which it strikes. Thus 1/5000 square inch multiplied by the measured impact of 100 lbs. would represent a pressure of 500,000 lbs. per square inch exerted by the scleroscope on hard steel.

In other words, regardless of how hard the steel may be, the surface is always indented by this minute hammer, and these indents may be seen with a magnifier.

As will be noticed in the photograph, the tube through which this hammer drops is graduated into a scale, and long experience has enabled scientists to tell the exact hardness of the metals by the heights in this tube to which the hammer rebounds. As an illustration of the accuracy of this instrument two views are shown in these pictures, one with the hammer rebounding from a properly hardened piece of metal, the other with the hammer rebounding from a soft piece of metal. If the hammer does not come to the proper height the material is discarded as unsatisfactory.

Many factories use simply a file to perform this test. It is a scientific fact that hardness cannot be always detected by the file, and even if surface hardness is determined by the use of a file, it is impossible to arrive at the degree of hardness. All the gears are tested particularly as to cutting and shape as well as to hardness and size. This is done to prevent the gear noise so often present in cars not properly constructed. In fact, this is common practice all through the factory — to watch for the elimination of noise as well as to watch for defects in the material and its construction.

When an Overland car is sold and delivered it is safe to wager that it has had as much wearing in and careful overhauling and inspecting as it could get in the hands of its owner in months. The work of this department emphasizes the principle upon which the whole factory operates very clearly—that is that Overland cars are built to last. They are built to insure repeat orders.

For instance, there are innumerable cases of trouble that are prevented forever by the inspection department that would not show up possibly for months, maybe years, maybe never. But rather than take the chances of having some fault develop and cause a dissatisfied customer the Overland company insists upon having all such faults anticipated and prevented so far as human powers and the most delicate scientific instruments make such prevention possible.

The question of ultimate saving comes up in connection with this department as well as in others where the initial investment figures largely. If by any chance some part slipped through the departmental inspection that was not correct and went to the assemblers it might eventually cost many hours' time and the tearing down of a partially assembled car. For instance, if a soft cam shaft or gear found its way into a chassis and then gave way under the road test it would mean a cost far in excess of testing a whole batch of parts.

Fig. 1. General view of inspection room.

Figs. 2, 3 and 4. Showing the various racks of micrometers, limit gauges and testing instruments used by the inspection department in the determination of the accuracy of the various parts which go into the completed car.

AFTER each of the various parts which go to make up the chassis have been thoroughly inspected as to size, physical condition, etc., it is sent to what is called the finished stock room, which is really a checking department on all the other departments in the factory. The man in charge of the stock room must sign for every piece that enters, and he in turn gets a requisition from the foreman of the assembly department for every piece that leaves, so that at the end of the year when the invoice is taken the records must balance.

From the stock room the foremen of the different assembly divisions draw the parts, which they finally put together in the completed car. For the sake of simplicity, and to make the story easier to follow, we will start with the assembly of the engine first, and then the general assembly into the frame.

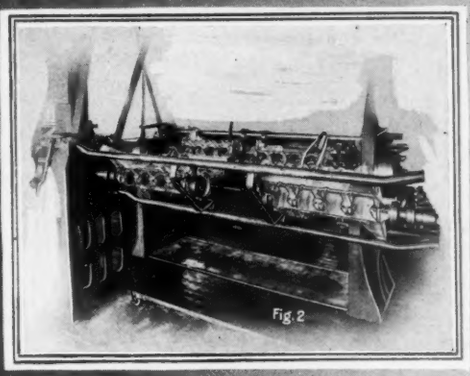


Fig.2

First the crank cases are laid out upon a table, and the white metal bearings forced into place and scraped. Then the crank shafts are fitted into the bearings, and the bearings locked down tight. The partially assembled case is then put into what is called a speed jack, and the crank shaft is turned over at a speed of about 250 revolutions a minute for a few hours. The case is taken to another bench and completely dismantled, the bearings are rescraped, and the case is put back on the same speed jack and run for an hour or two longer. Then the case is moved to another speed jack which runs at 450 revolutions per minute, where it is allowed to run several hours more, until, running at this speed, the bearings do not heat beyond the limit of holding in the hand.

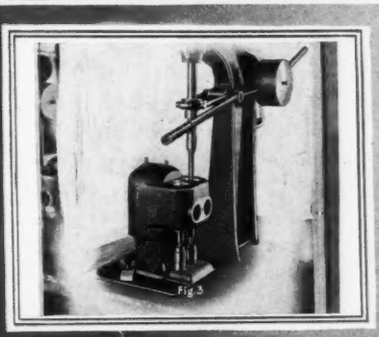


Fig.3

While these various assembled shafts are being driven at this speed the man in charge of this work goes along and lays his hand on the bearings in which the crank shaft is revolving. If he can hold his hand on these bearings without burning it, or as said before, if the bearings run cool, then he knows that the fit is accurate, and the case is ready for the next man to handle.

Fig.4

While this work is being done on the crank cases the cylinders are being assembled in another part of the room. First they are subjected to a 100-lb. water pressure test. The valves are seated by machine grinders, and the valve springs are all tested and matched to each other.

Right here is a very important point which has lots to do with the quiet running of the Overland car. If the spring in one valve operates, we will say, under 50-lb. pressure, and the spring in its opposite valve operates under a pressure of 70 lbs., the difference in the tension between the two springs will produce what is commonly known as valve noise. To avoid this condition the Overland specifications call for a definite weight of all springs of definite length. In other words, if two springs be made of the same gauge wire and are of the same length and of equal temper, the tension in these springs is identical. All springs on all Overland engines are required to come up to these specifications, so that they are absolutely uniform in action. Then the gaskets, plugs and retainers are put into the cylinders.

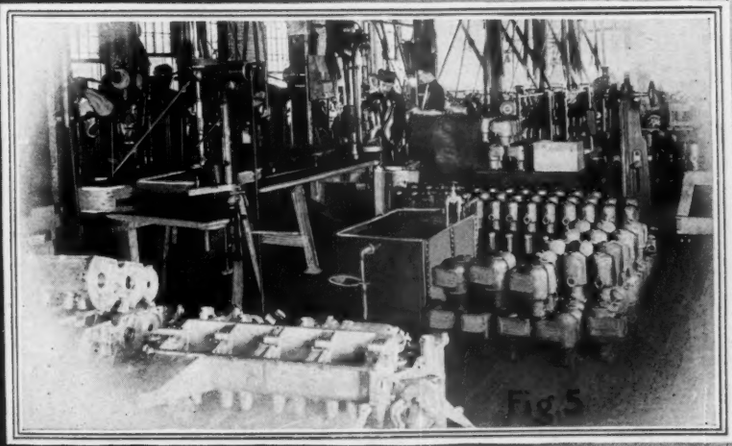


Fig.5

The pistons and connecting rods in the

Fig. 1

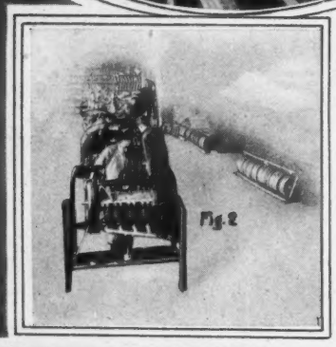


Fig. 2

Fig. 3

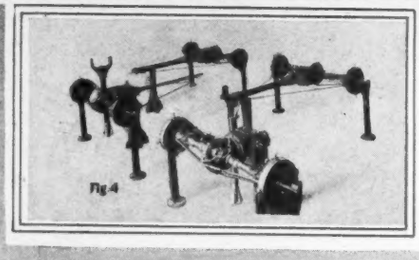


Fig. 4

meantime have been tested again, piston pins have been put in and locked and wired, so that when the cylinders are finally put together all that is necessary is to drop the pistons into the cylinder.

In the assembling of the cylinders the connecting rods are first assembled to the pistons; then the rings are assembled to the pistons and the pistons then assembled to the cylinders, so that the fit is perfect all the way through.

Then all these various parts are put together, until you have one solid engine unit ready to be mounted into the frame. In the meantime the rear axles and front axles have all been assembled in another part of the shop, as also have the other parts which go to make up the chassis, such as the gears, manifolds, carburetors, magnetos, lubricators, radiators, etc. The magneto and all the accessories are put into place on one side of the room, and then the engine without its cylinders is passed over to the other side of the room, where the work of putting the cylinders and valves in place and attaching the manifolds is performed.

Just as soon as the engine is thoroughly assembled and ready to be bolted into the frame it is sent down to the engine testing room for what is known as a block test. The engine is belted up for about two hours, and driven by other than its own power to limber it up so that it will start easily. Then it is put onto the block and run from 8 to 16 hours under its own power. During this time two men watch the engine performance constantly, testing it frequently by brakes until in their judgment, based on long experience, it is ready to be inspected by the foreman in charge of this department. Then the foreman goes into an examination of the engine very thoroughly. And if there is the slightest indication of anything but the smoothest sort of work — if the engine does not turn up the power that it should — it is sent back to the chief inspector of the engine assembly department.

After being thoroughly tested the engines are sent, together with the remainder of the parts that make up the assembled chassis, down to the chassis assembly room, where they are assembled and then turned over to the road testing department.

The chassis assembly room covers an enormous amount of space and is most interesting to the outsider as he travels through the plant. Here the numerous parts and assemblies of parts are seen stacked and hung around in every nook and corner, with the center of the space literally filled with frames ready to take the parts they carry in the completed car.

An engine unit suspended in a sling from a crane is rushed up to a frame and almost while it is being told the engine is lowered into position. Then the workmen make it fast in its moorings, watching like hawks to see that every bolt and nut fits perfectly and that every dimension is accurate.

Another crew of men is working on the rear system, which has been sent down substantially ready to take its place. Still another crew of men works on the transmission and center portion of the frame.

Radiators are connected up to the power plants — steering gears are

Page 17

Fig. 1. Assembly Stands.

Fig. 2. Speed jacks.

Figs. 3 and 4. Valve grinding machines.

Fig. 5. Cylinder pressure test.

Page 18

Figs. 1 and 2. Engine assembly.

Fig. 3. General view.

Fig. 4. Rear assembly.

bolted and locked firmly into place — brakes and brake rods are set and given their first adjustment and so forth down the line till the chassis is completed. It fairly seems to grow before the eye and in a remarkably short space of time it is ready to be given its first test.

As mentioned previously, it is here, as well as in the other assembly departments, that the accuracy of the preliminary machine work and testing counts to the greatest degree. For if every hole in every part were not absolutely right in relation to all the other parts the assemblers would be in hot water all the time. For instance, if in the heavy machine department the operation of boring the holes in the crank case were not perfect and performed with the parts in a jig and by positive automatic machinery, there would be no end to the delay of assembling the engine in the chassis. Forced fits would be found everywhere, and in many cases the entire assembly of the chassis would have to be stopped while the errors were corrected. And the correcting of the error might mean the entire dismantling of the assembled plant. These are the things which make the cost of production on a small scale so much larger in proportion than in the Overland plant. There are many manufacturers to-day who are forced to face this problem constantly, and as is always the case, the buying public is forced to carry the burden.

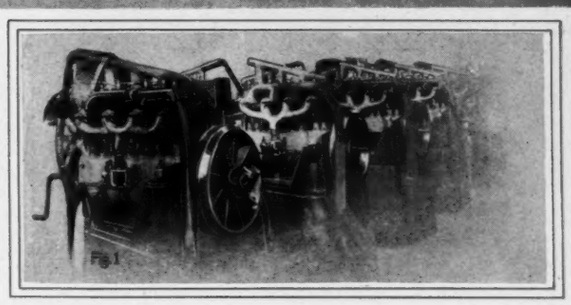


Fig. 1

Fig. 2

Fig. 3

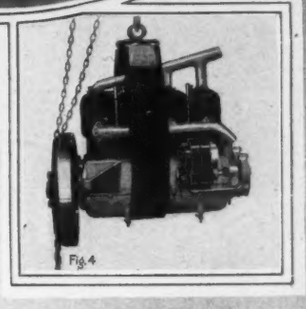


Fig. 4

But in the Overland plant the work in the assembly department moves along with clock-like precision. Every part fits every other part. Talk about standardization and interchangeability of parts. All that any man needs do to see it exemplified in its highest degree is to watch the assembly of an Overland car. Watch one of the workmen grab a steering gear assembly from a rack of a hundred and walk over to any chassis at random and put it into place with as much ease as he would screw a bolt onto a screw after having just taken the bolt off. And this is true with every part. They are all sent in to the room in racks and taken off regardless of what frame they mount and put into place with never a thought of anything but a perfect fit.

After it reaches the road testers a set of rough wheels is put upon the chassis, which is thoroughly oiled. A rough body is fastened on and the tester tunes up and adjusts the engine so that it will work nicely on the floor. Then he takes the car out on the road and drives it anywhere from 3 to 4 or 5 hours, as the case requires, making whatever adjustments he finds necessary by the wayside. This road test is made over various sorts of roads, good and bad, through sand and up and down hills. After the car is returned to the shop by the road tester in first class condition, it is turned over to one of the inspectors, who then takes the car himself and gives it a hard tryout, to be certain the tester has done his work thoroughly.

After the car has been brought up to standard, it is sent up to the paint shop, after having been thoroughly washed by means of a steamblast. There are an average of about 100 men employed in this department, 35 to 40 of whom are used on the outside road testing.

Fig. 1.—A row of assembled engines running under their own power on testing blocks.

Fig. 2.—Work being done on chassis in chassis assembly room.

Fig. 3.—General view of chassis assembly room.

Fig. 4.—Method of carrying assembled engine by means of sling.

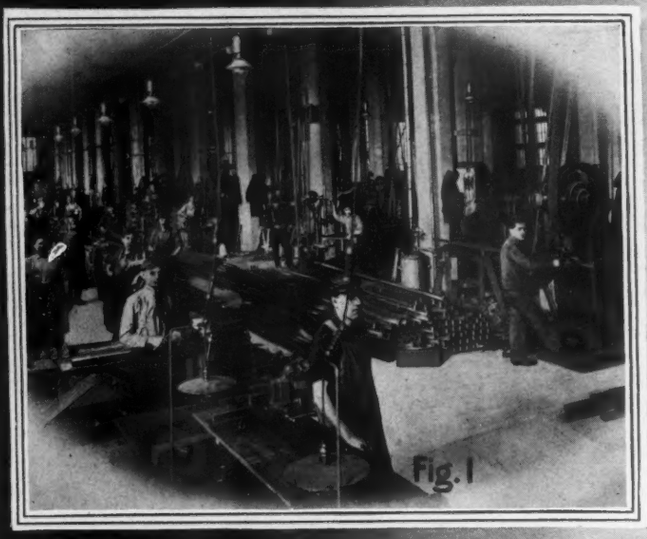


Fig. 1

IN THE sheet metal department, where the fenders, mud guards, parts of the body, hoods, radiators, frames, and other similar parts are produced, about every kind of mechanic, from a tinsmith up to a structural iron worker — such as you see on the lofty skyscrapers — is employed.

The machinery in this part of the factory is the most massive and the most remarkable in its operation of any machinery in the whole plant, with the possible exception of the massive drop forge hammers. Here, for instance, you will find a huge punch press which stands nearly 23 feet high, used for stamping out certain parts of the steel used in the assembly of the car. Here also you find a press which at one fell swoop transforms a flat piece of sheet metal into a properly shaped frame side member. These flat sheets of steel are put under these various presses until the side members and parts are pressed into exactly the proper shape. Then the holes are all drilled in accurate jigs, again insuring interchangeability. The frame is then turned over to the riveter, who puts them together with hot rivets with the same care and by the same methods as the modern steel skyscrapers are built. It is important to note that the riveting is done with hot rivets instead of cold ones. If a piece of cold steel were forced into the rivet holes, which would be a cheaper operation, as the cost of heating the rivets would be eliminated, this cold steel would vary

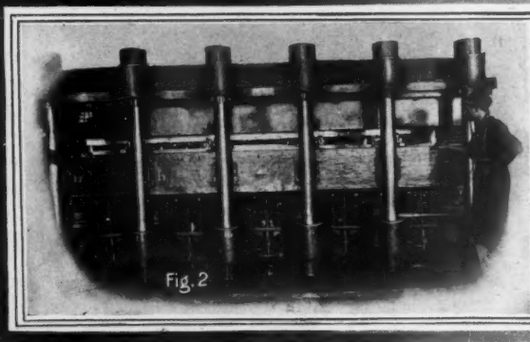
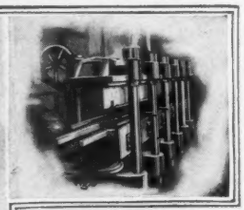


Fig. 2



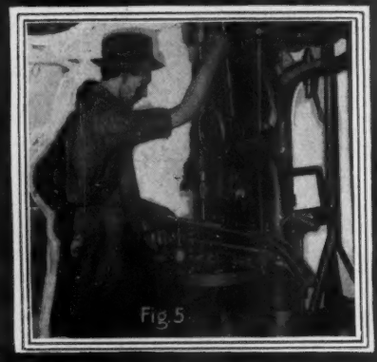


Fig. 5

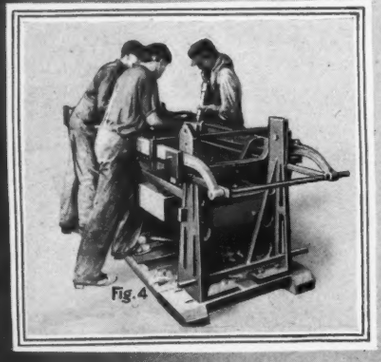
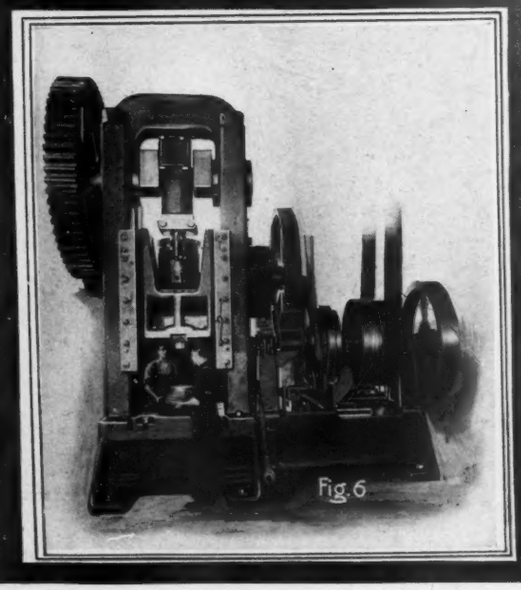


Fig. 4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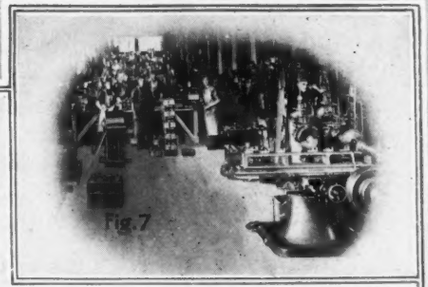
Fig. 7

Page 20

Fig. 1. General view frame department.

Figs. 2 and 3. Frame side member press.

Fig. 4. Riveting frame. Fig. 5. Drilling frames.

Fig. 6. Pressing brake drums.

Fig. 7. General view.

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Fig. 1. General view radiator department.

Fig. 2. Shows stacks of finished radiators.

Fig. 3. Soldering radiator.

Fig. 4. Giant press. Fig. 5. General view.

in size with all the temperature variations when the car was finally put into commission. As a result, the frame would be full of noise and rattle. But by putting the rivets in under high heat, when they have cooled to the atmospheric temperature the expansion of the metal has made them tighter than when they were first installed. In another division of this department the soft and lighter sheets of metal are cut and formed into the fenders and mud guards.

Fig. 1

In the making of these parts there is a great deal of hand work in addition to the machine work, and much of the dash and classy appearance of Overland cars is due to the hand work and individuality put into the shaping of these parts.

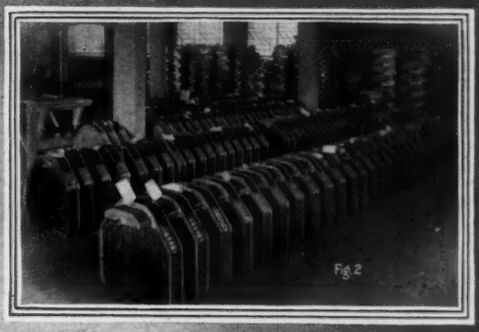


Fig. 2

The machine which is used for pressing out the cross members of the frame and also for punching the holes in the brake drum weighs 49,000 pounds, or almost twenty-five tons. The bed of the machine, upon which the sheet steel rests while it is being pressed, is nearly four by five feet in size. The balance wheel is over five feet in diameter and weighs considerably more than a ton. While the belt wheel, that is, the wheel directly connected to the power that drives the machine, revolves at the rate of 225 revolutions per minute, the slide which moves up and down, carrying the tool which finally shapes the metal, makes only 30 strokes a minute, or one every two seconds. In other words, the gear ratio is seven and a half to one, so that all the power derived from the speed is concentrated into a few terrific pressure blows.

Fig. 3

The still larger machine, which is used for drawing out the brake drums, weighs 85,000 pounds, or 42½ tons. Its measurements in general are proportionately larger than the smaller machine used for the frame cross members. But this giant is geared down to forty to one, so that while the belt wheel makes 280 revolutions per minute, the slide moves downward only seven times per minute. This machine exerts 1,000 tons pressure (2,000,000 pounds) and is run by a 40 horse power motor. It has a capacity of 2,000 brake drums per day. These brake drums, that is, the large ones, are steel, nearly a quarter of an inch thick. A piece of this metal about two feet square is laid under the press and in the twinkle of an eye, almost, a finished drum with an opening of 14 inches and a flange 5½ inches is pushed out of the solid sheet. Words fail utterly to describe the action of these giant machines. They handle heavy sheet steel with as little trouble as the average person would fold or

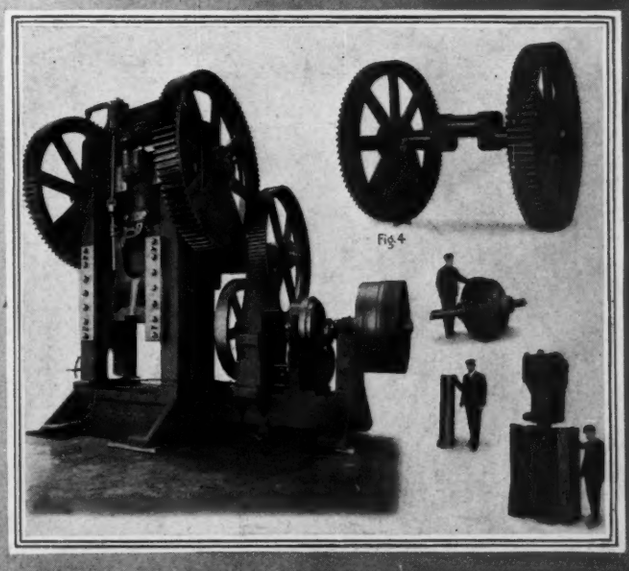
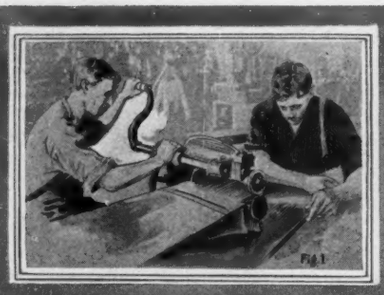
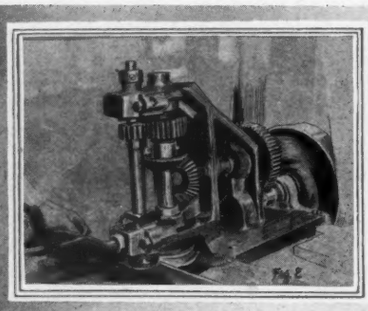
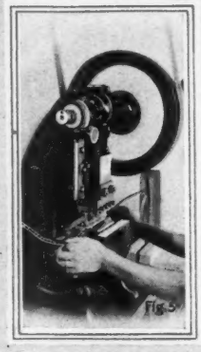


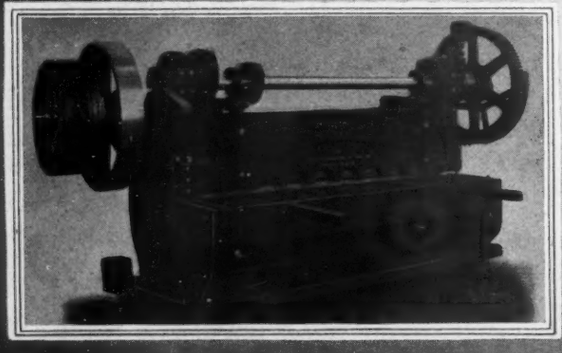
Fig. 4

Fig. 5









cut a piece of paper, and to stand and watch them without knowing what they were doing one would never dream of the tremendous power under which they are operating.

No less remarkable in their operation are the side rail presses, which, as the name implies, press the frame side members out of flat steel plates. These machines, which are exclusively Overland in many ways, were designed in the Overland plant and built specially to meet the requirements of this company. They exert 1100 tons pressure and are driven by water power. They are six-cylinder presses, operated under 50 horse power. The dies for these machines cost from $600 to $800 and are made out of 70-point carbon steel. The capacity of either of these presses is about 500 ordinary side rails a day. A flat piece of steel is placed into one of these presses, as in the others, and not only does one operation shape it into a side frame member, but it also cuts and blanks it to proper shape all around.

One rather interesting operation is shown in the manufacture of wire terminals, such as are used in the ignition assembly. These machines are really small punch presses. A thin sheet of copper is fed through the first machine, which stamps out flat pieces shaped so as to fasten around the copper wire. The next machine through which are fed these first stampings simply rounds them so that the wires can lay into them properly. Then the third machine bends and clasps the copper terminals around the scraped wire ends. The wires, which are really braided cord such as is used in electric light installation, are cut to uniform lengths by a cutting machine operated by hand. The interesting point about this whole operation is that so many of these terminals are used that it becomes necessary to make them by machinery.

WHEN the word "Automobile" is mentioned one's thoughts naturally turn to a mass of metal. The idea of any appreciable amount of wood entering into its make-up seldom occurs to the average car user.

A trip through the Overland factory will dispel this mistaken idea in an instant, for it will show you nearly one-fifth of the 80 acres of floor space devoted to the handling of the finest grades of woods.

In the Overland plant you will find a dry kiln capable of storing a million and a quarter feet of lumber, and which cost $50,000 to build; a completely equipped saw mill such as may be found in any big lumber institution; a planing mill; carpenter shop; cabinet makers' department; pattern room; and all the various subdivisions of the wood working industry, each complete in its equipment of machines, and exceptionally well supplied with the finest mechanics money can hire.

Fig. 1

While the majority of this wood is used in making the bodies, a large portion of it is worked up into tool boxes, seats, running boards, thresholds and other small parts. Then, of course, there is the rough stock for making crates, boxes, etc. Wood is also used for the making of the master patterns.

Fig. 3

Fig. 2

If you have ever wondered why an Overland car always looks particularly bright and snappy you will find the cause of your wonderment in the paint shop at the Willys Overland factory.

If you were told in an offhand manner that it required twenty-two distinct handlings of the body, and about two weeks' time, to bring a rough body to a completely finished one, you would scarcely credit it as the truth. Nevertheless this is literally true. In this respect alone Overland cars occupy a position unapproachable by any other car in the market at anything like its price.

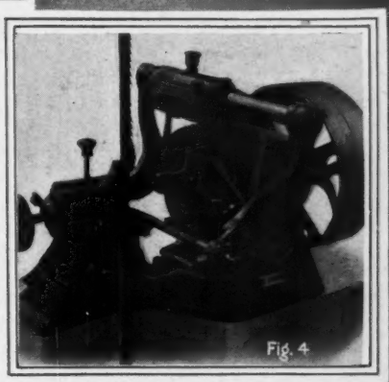


Fig. 4

In the first place the painting, sanding, rubbing and varnishing are all done under the supervision of a master painter who watches the operations in the different stages as a cat would watch a mouse.

When the car body comes into the paint shop, the metal parts are first scoured, sanded and cleaned.

Then a priming coat is put on, retouched and thoroughly sanded again.

The fifth operation sees the body getting its first coat of filler, the next four operations are the application of four different and separate coats of rough paint. Between the application of each one of these coats in the rough, the body is placed in what are called "force rooms," and allowed to remain from six to twelve hours.

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Figs. 1, 2, 3, 4 and 6. Show operations on sheet metal fenders.

Figs. 5, 7, 8 and 10. Wire terminal machines.

Fig. 9. Cutting press.

Fig. 11. General view.

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Fig. 1. Saw mill.

Fig. 2. Sand papering wheel.

Fig. 3. Band saw for irregular work in special jig.

Fig. 4. Automatic saw sharpening machine.

Fig. 1

Fig. 2

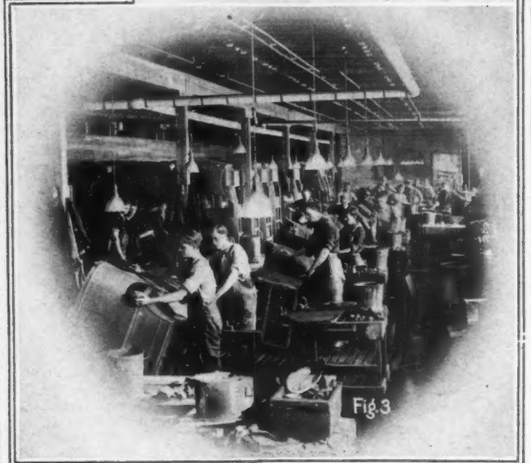


Fig. 3

Figs. 1, 2, 3 and 4. All show different stages of finishing operations on the bodies.

Fig. 3. Shows in particular how the bodies are rubbed off.

THE temperature of these rooms is 120 degrees Fahrenheit. The rooms are 300 ft. long and 20 ft. wide, and divided into separate compartments. These compartments are double sealed with a huge nonconductor between each of them.

The tenth operation is the rough rubbing, which is started with a fabric brick and finished with pumice-stone; then the car body is entirely sanded again, and once more it is touched up.

Next the colored varnish is put over the paint, and in the fifteenth operation the first coat of rubbing varnish is worked on. The sixteenth operation calls for the first rubbing out of the varnish with powdered pumice, water and a liberal quantity of elbow grease; then the second coat of rubbing varnish goes on, which is also given a rub out.

The nineteenth operation sees the body having a bath in clean water and thoroughly rubbed with clean water. The twentieth operation is what is called the touching up process, which really means that certain parts which may have been rubbed down too hard are retouched that they may be equally smooth and blend with the rest of the body.

The twenty-first operation is the applying of a stripe, which is done by hand. The twenty-second operation is the application of the finishing coat of varnish, which calls for the finest kind of artistic work.

These details will show better than anything else the extreme care used in making the Overland production quality as well as quantity. Any one of these bodies could be turned out in one-quarter of the time, and look to the ordinary man just as well as the body which goes through all of these operations, but in a few days the difference would become noticeable. In other words, it requires this work to make the finish durable and long lived.

There are over two hundred men employed in this department, all artisans averaging about $4.00 per day.

The treatment of the chassis and wheels is somewhat different in that it doesn't call for so many different handlings, but it is just as thorough as that of the bodies.

After being thoroughly cleansed with the steam blast after the road test, the chassis is first sanded and cleaned by hand. Then the priming coat of paint is put on and the entire chassis touched up. Once more it is sanded and then it is given a coat of surfacer. Next the coat color is put on. When the color has been on the right length of time the first coat of color varnish is applied. This is rubbed off and in some cases another coat of varnish and another rubbing is necessary. Then the stripe is put on by hand, the entire job is washed and cleaned and finally finish varnished.

In this department all the parts move in an endless chain. They come in one door in rough state and, passing through each stage, go out another door in finished state.

In the enameling department, where fenders, dust pans, tool boxes, running board shields, lamp forks, gas tank brackets and bands, and other small parts, such as top irons and control hand levers, are treated, the same general care is taken as in this department.

The first operation in the enameling room is to bake each of the parts in an oven for about three hours to remove all of the grease, etc.

The second operation is to emery all of the parts off by hand.

The third operation is to give the parts a coat of graphite, after which they are baked again for three hours. The graphite is applied as a filler and to assist the enamel in sticking.

The fifth operation is the first dip in the enamel, after which they are allowed to drain for forty-five minutes and then are placed in an oven for another three hours at a 360 degree temperature.

The next operation is another sand with a very fine grain of emery paper. Then they have the finished enamel and are baked once more.

The enameling room is also equipped with a steam oven, which is entirely lined with steam pipes, for baking the parts that are soldered, such as lamps. There are eight of the dipping tanks and each contains two hundred gallons of enamel.

Fig. 1

Fig. 2

Fig. 3

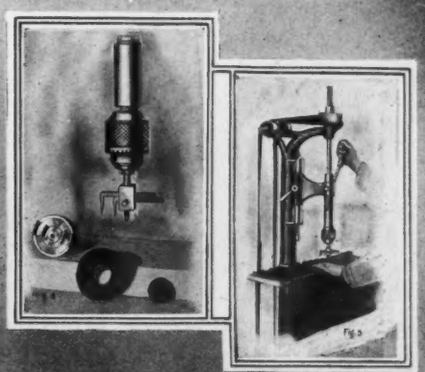
When it comes to the question of finish and appearance the Overland makes comparisons regardless of price or make. Naturally a car costing twice or three times as much as an Overland would be larger or of greater horsepower or carry perhaps some more accessories than the Overland. But on the question of finish and general appearance the Overland knows no superior. It was common trade talk all this past season that the Overland torpedo cars were the handsomest torpedo types ever produced at any price. This was freely admitted by our most energetic competitors. To produce better or more beautiful work is simply impossible. All the time that is necessary to do the work is spent upon it. Nothing but the very best of materials that can be bought are used in the work and nothing but the best of artisans are used on the work. There simply isn't anything left to be done that could in any way add to the perfection of details. In the original designing and planning of the lines of the finished product and in the selection of color schemes the ideas of a master artist are employed. There is just as much care and planning as in the mechanical construction of the working parts of the car.

Figs. 1, 2 and 3. Show various stages of wood working operations on the car bodies and car seats. They give a general idea of the extent of this department in relation to the entire factory.

Figs. 4 and 5. Show a machine in operation of cutting out felt and wood fibre washers. The cutting tool which this press carries revolves at rapid speed, cutting out two washers at every operation, as shown in the cut. The Overland company uses so many of these washers that they save money by making them themselves.

True enough, it is better to have perfect mechanical construction and ordinary finish than poor mechanism and fine finish, as was the case in some of the failures of the past.

But with the Overland in the field there is no need of having the one without the other—for the Overland supplies both. The finish is a detail only, but in the case of the Overland it has been the detail that has taken the car from the commonplace to the extraordinary.



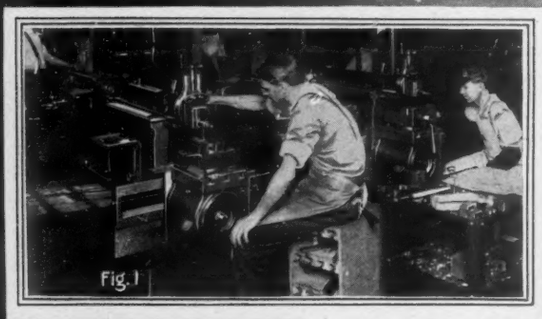
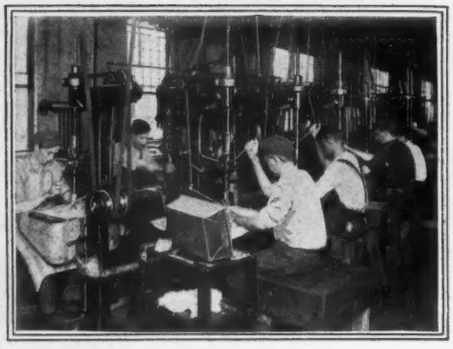


Fig. 1

Fig. 3



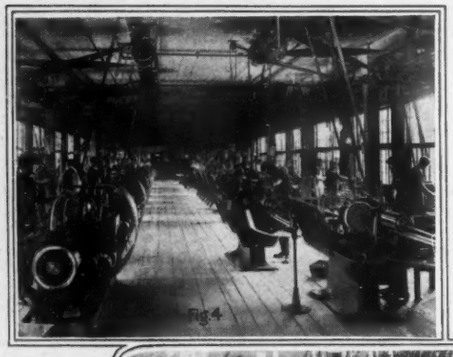


Fig. 4

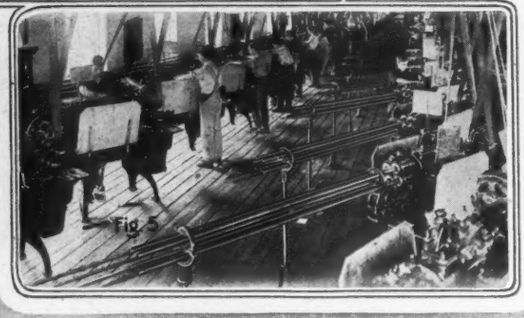


Fig. 5

PROBABLY one of the largest and most complete screw machine departments to be found anywhere is that of the Overland plant. This part of the plant covers almost 13 acres of ground and its equipment is without parallel in the industry. Really, this plant is more than a screw machine plant, in that its equipment includes a full line of milling, drilling, lathe and gear cutting machines, in addition to the screw machines, both hand and automatic.. So large and so complete is this plant that part of its output is sold to jobbers from whom the Overland formerly bought the products it now manufactures.

In this plant there are 90 automatic screw machines, over 60% of which are of the 4-spindle design. These machines, as the name implies, are used for the manufacture of standard cap screws, bolts and nuts. The stock, which is in the form of long pieces of wire of heavy or light guage as the size of the finished product demands, enters the building at one end and passes on down through the machines in succession, coming out the other end in finished shape, ready for the inspection department.

In this same department nearly all of the transmission gears are cut, the universal joints are made, and complete transmissions turned out and assembled.. It is to perform this last line of work that the lathes, milling machines, drill presses, boring machines, water grinders and heat treating plants are required.

Figure 1, on the left hand page, shows a corner of the tool room used principally for keeping up the stock of tools used in this plant. Figure 2 shows one bank of spindle drill machines. Figure 3 is a close view of two or three of a long bank of automatic screw machines. In Figure 4 you are looking down between two long lines of hand screw machines. Two rows, or rather parts of two rows, of the roomful of automatic screw machines are shown in Figure 5. This really shows less than half of the actual number of these almost human contrivances, and gives a fair idea of the extensiveness of the plant. It also gives a fair idea of the immensity of the Overland production when it is remembered that these machines turn out automatically and at a rapid pace only the standard cap screws, nuts and bolts used by the Overland company (except for a small number sold outside occasionally). The long bars projecting from the ends of these machines are the guides which hold the stock, which is finally worked up into the finished product.

The operator simply loads these machines with this wire stock, starts the machinery, and devotes the rest of his time principally to watching the work of the machines.

On the right hand page, Figure 1 shows a small corner in the milling machine department working, when the photograph was taken, on gears. Figure 2 shows one of the special tools being used for turning out universal joint yokes. One of the completed yokes is shown standing on end in front of the tool. Gears are cut automatically with the bank of machines shown in Figure 3. At the extreme left of Figure 4 drilling operations are shown on the transmissions. This shows one of the spindle drills working on a transmission case in the special jig built for that purpose. At the extreme right is shown a milling machine working on

a case. Figure 5 shows another type of screw machine operated by hand.

Another department in the Overland plant which has to do in its own distinct way with most of the other departments, and which is perhaps the most modern in the entire automobile industry, is the die shop.

Just completed at the Willys-Overland plant is the most modern die shop identified with the automobile industry. Good die making is the right hand work of good forging, for without good dies good forgings cannot be produced. A die is the negative in metal of the forged piece itself. It consists of two blocks of steel, each bearing indentations or impressions which, when struck together with a piece of heated metal from which the forged section is to be made, give to the forged section itself the exact shape desired. The work then of producing these indentations in steel is the work of the die-making department.

That there must be ample light for the workmen to produce a good die is obvious. Much of the work of the die maker is done by hand. A mold is literally hewn from a steel block—like a marble cutter cuts letters into stone. Ample light is provided in the Overland die shop by plenty of windows on all sides, set in iron sashes and a like treatment in the roof, also provided with wide lantern construction for giving the best of ventilation. The building is of solid concrete construction, 50x125 feet in size.

Machinery equipment for this department is of the most modern type. There are two large planers, one with a capacity for handling a block of metal 48 in. x 48 in. 8 feet long, the other 30 in. x 30 in. 6 feet long; two heavy vertical mills, three die-shaping machines, eight shapers, two drill presses, five lathes and the best quality of hand tools, all of which are used for one purpose, namely: to gouge out in metal dies of perfect accuracy.

The die maker, like the stone cutter, must necessarily be able to work from all sides of his piece. Either the die block must move or he must be able to work on all sides of it. Instead of the customary manner of placing the die on the side bench, circular benches are provided where, with the die block placed upon it, the workman is enabled to approach from all sides.

Provision is made for handling the heavy die blocks by a large traveling crane, and the room is so perfectly equipped with crane switches as to enable the transportation of a block to any part with little effort. All machinery is operated by a 25 horse power motor, which drives a shaft to which they are belted.

In order that there may be no error in the dies preceding their being hardened and later going to the forge shop to be placed on the anvil and attached to the hammer, lead proofs are taken, that undergo a careful measurement and inspection.

It requires weeks to turn out a completed die. As only the highest type of skilled mechanics are employed in this work, the cost of die production is very high.

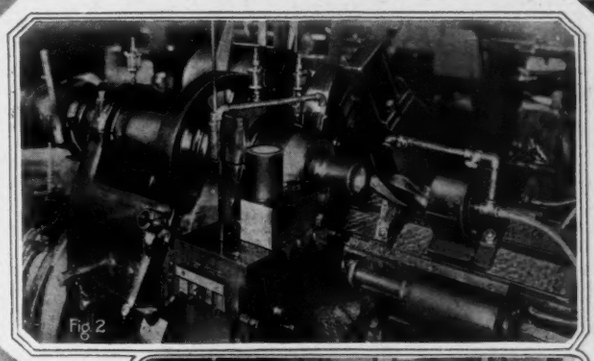


Fig 2

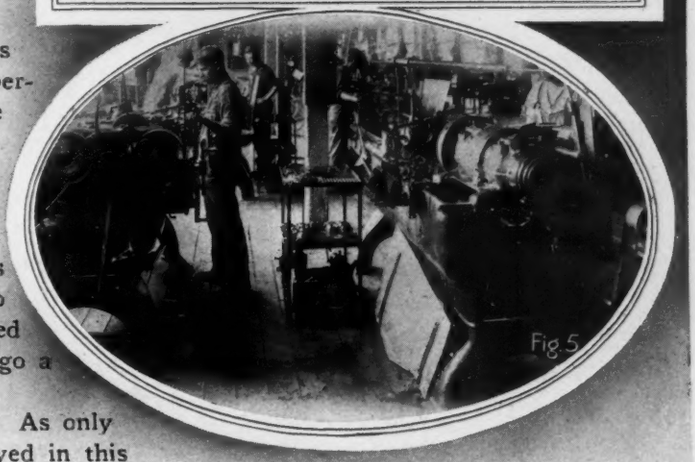


Fig 5

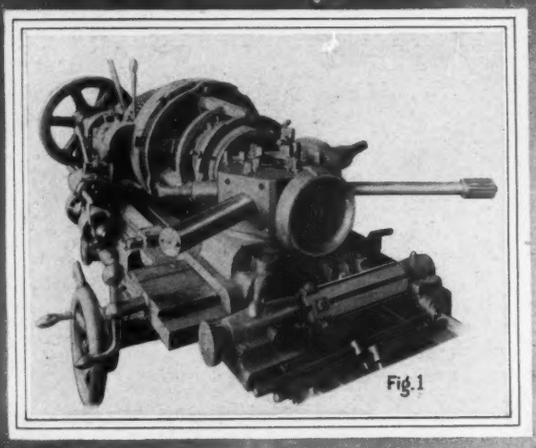


Fig.1

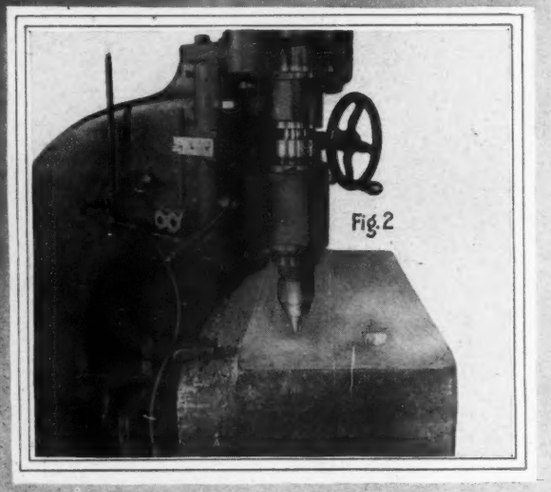


Fig.2

SO many and so varied are the special tools and machines required by the Overland mechanics that an enormous tool room is kept running full force most of the year. In fact there is scarcely a department throughout the entire plant that does not contain evidences of the importance of the tool room. Most all the special fixtures used for handling the parts during the machining operations: jigs, machine tools, etc., are produced entirely within the confines of the tool room. The special cam grinding machines and the special cam milling machines illustrated previously in this story were designed and made in this department of the Overland plant.

All of the fixtures of the engine testing block stands are the products of the Overland tool room. There are eighty men employed in this department and it is needless to say that they rank high as mechanics. Much of the reduction in price in proportion to the value given in the Overland products is directly traceable to the efficiency of this department. The foremen of the various machine departments are constantly observing ways and means of eliminating labor and saving time. They see where separate operations that are requiring separate handling could be handled at the same time that certain other operations are performed if proper machines could be designed. They communicate their ideas to the men in charge of the manufacturing end, who in turn put the problems up to the experts in the tool room. Sometimes it requires months of experimental work and planning before the machines are turned out which ultimately develop into great labor and time saving devices.

Another function of the tool room is the making of the parts for the model cars. When the engineering department has decided upon a new model or changes in an old model the work necessary to produce such changes is turned out in the tool room, then it is assembled in the model room and tried out in actual practice on a model car. If the changed parts do not operate as originally planned they are sent back to the tool room and changed again until finally the new parts or car, as the case may be, perform satisfactorily under the severest sort of tests conducted by the engineering department.

After this is done the tool room takes the parts originally made therein and from them builds the jigs for equipping the tools throughout the factory for the making of these parts in quantity. The reasons for the necessity of highly skilled mechanics for this department are plainly apparent. They must be men thoroughly able to do any sort of work which they may be called upon to turn out. After the tool room has made the jigs and special tools for the various departments to use, it is largely an automatic proposition to simply see that these tools perform the work they are made to perform. This statement doesn't mean that all the skilled labor is confined to the tool room but rather that the tool room attracts the cream of the best mechanics with special qualifications. A mechanic might be exceptionally well fitted to do the most difficult sort of work in a lathe or milling room and still lack the knack of tool making. For in the tool room the men must be originators as well as workers along given lines.

In fact, their labor is a great deal more varied and perhaps a great deal more interesting than the work in most of the other machinery departments.

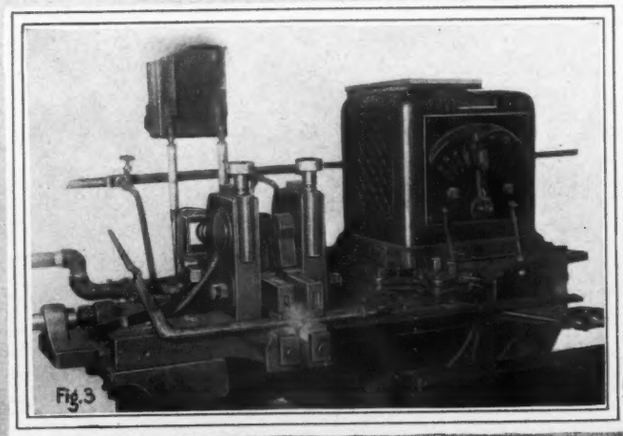


Fig.3

IN factory parlance, what the layman would ordinarily call the upholstering department, is known as the trimming department.

In the Overland plant this is a very extensive institution. It is thoroughly equipped with the most modern power cutting and sewing machines, machines for renovating hair, machines for tufting cushions, backs and tonneaux.

Fig1

The Overland Company uses nothing but the best grade of hand-buffed leather on the more expensive cars and the highest grade of machine-buffed leather on the less expensive cars. They buy nothing but whole hides which contain from fifty to sixty square feet, costing an average of from twenty to thirty-five cents a square foot. It requires from two to three hides to upholster each of the various models.

Fig2

First, the hides are cut from metal patterns; they are then assembled and punched, after which they go to the sewing machines. Then they are placed on the tufting machines and finally passed into the trimmers' hands. The trimmers tack on the leather and place two rows of pillow springs in the back of the seats underneath the hair. The cushions contain spiral springs. There is a great deal of hand work in this department, notwithstanding the fact that the Overland Company uses more labor-saving machinery than the average. For instance, the tufting machines do the work of dozens of men with the services of few. One of these machines is shown herewith in operation, just after having been filled with the materials which enter into the completed cushions and backs.

In the top department, the same attention is paid to interchangeability and uniformity as in all other departments. The bows are sent up from the wood working department in racks. After these bows have been driven into the bow sockets they are assembled over a jig of the size, shape and contour of the finished article.

The cloth and fasteners are then attached to the tops and the bedding put in around the edges to give a round finish, and the tops are sent to the shipping room.

The cloth used in this work is held on reels at one end of a heavy table. It is cut to size by an electric cutting machine and stacked up in piles of 50 tops. Then the girl operators crease this cloth and take it to the power sewing machines, where the finished work is done. This also applies to the side curtains, except that the inside case of the side curtains is sewed in by the girls. In this top department more than 400 yards of mohair, nearly 54 inches wide, and more than 100 yards of rubber are cut up every day for about 300 working days in the year.

Reduction of overhead, combined with the ability to buy in great quantities, has enabled the Overland Company to turn out tops at prices astonishingly low, compared with their real value. The principal factor of operating this department is not to make a profit on its output, but rather to supply tops designed to the car and thus make a harmonious whole that is unobtainable when tops are purchased separately.

There is only one reason for the recommendation of locally-made tops and that is that the margin of profit in such tops is greater than in the sale of Overland tops. There is in the Overland plant a most competent and experienced artist whose sole duty it is to add beauty, grace and attractiveness to the completed car. It is he who lays out all the body lines, designs the hood, tonneau and seats and then lays out a covering to conform to the rest of his work. It is his individuality that is responsible for the whole appearance of the completed car. Consequently any top that is made other than under his supervision and design must of necessity be a makeshift and not in accordance with the rest of the car.

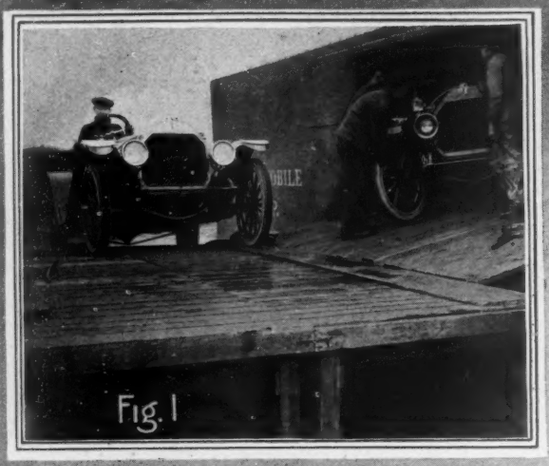


Fig. 1

AFTER the chassis and the various other parts of the completed car have gone through the paint shop, they are sent down to what is known as the final car assembly department. Remember that the chassis is entirely assembled and painted, body, etc., are assembled and painted. In this final car assembly department the dust pan, steering gear, boots, gas and generator lines, windshield, running boards, wheels, mud guards, fenders, accelerators, etc., are placed in their proper position as a completed unit. The running boards come to this department in somewhat rough shape, are put into a jig and the holes drilled, so that they are all interchangeable. Jigs are also used for laying out the toe boards.

The body is then placed on fixtures that rotate so as to place either the top or the bottom of the body in an easy, accessible position for the workmen. While mounted in this fixture the dash boards are drilled for the coils and ignition apparatus, etc.

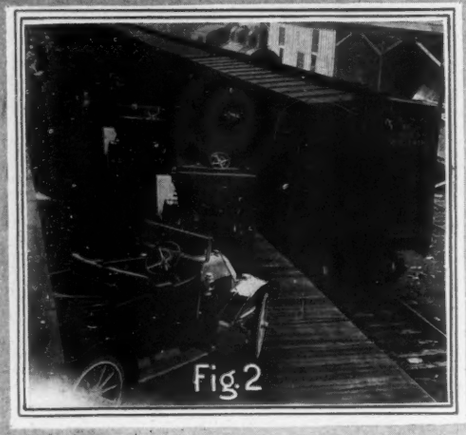


Fig. 2

One special machine in this department which is a great labor saver and which makes for the highest grade of work, is a special punch press used for cutting mitre joints on the brass border strip used for trimming up the various parts of the dash and body. This machine with one punch, by means of a 90-degree cutting tool, prepares this mitre joint so that the strip needs only to be bent. It eliminates a lot of hand sawing and uncertain work.

There is absolutely no lifting or carrying of either bodies or chasses in the paint shop, as they are placed on rolling trucks. The chasses are kept on these trucks until the new wheels are put on them in the final car assembly. The bodies are also set on trucks until they are lifted by means of "fall and tackle" on overhead tracks and placed in position on the chassis. This is a wonderful labor saver and time saver, for the reason that in a crowded factory it would be next to impossible to push these heavy cars around on their own wheels.

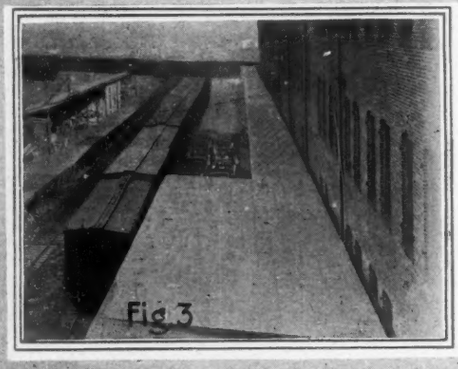


Fig. 3

After the cars have been completely assembled they are delivered to the final road testing department, and the adjustments are carefully inspected and the cars driven five miles to see if any rattles or loose parts develop. The oil and grease cups are filled and particular attention given to the adjustment of the brakes. After the testers have finished the test, the cars are given to the final test inspectors, who take them out to check up the testers. From this point they go to the shipping department, where they are cleaned and polished and sponged. The average single-deck box car will carry three automobiles. Double-deck cars, which admit of the shipping of six cars by taking off the rear wheels of the three cars which go on the upper deck, are used for long hauls.

Fig. 4

Fig. 1. View of upper deck of double deck automobile freight car showing an Overland inside the car.

Fig. 2. This is a view of the loading platform as it exists today. Additions are being made on it.

Fig. 3. Another view of one of the loading platforms, showing a string of freight cars ready to be loaded.

Fig. 4. Showing method of loading Overland cars into double deck freight cars. The automobiles are all driven onto this loading platform under their own power, then they are drained of fuel and stored away in the cars.

Motors. All Overland motors are 4-cylinder, 4-cycle, of Overland design and manufacture. Cylinders are cast singly, and have large water jackets. Crank shafts, connecting rods and other motor forgings are made of high carbon manganese steel. The motor is suspended upon three points from the main frame, and is constructed in its entirety with a view to the accessibility of all parts.

Valves. Overland valves are of the mushroom type and interchangeable, made from 35 per cent nickel steel heads, electrically welded to carbon steel stems. Their design and large size enable the motor to develop 15 per cent more horse power than any other motor of the same bore and stroke. The lower end of the valve stem is hardened and comes in contact with a fibre insert in the adjusting screw, which in turn fits into the square push rod. This construction is an important factor in the silence of Overland valve action.

Radiator. Overland radiators are of the famous Kinwood flat tube type. The radiating surface is unusually large, with large diameter intake and outlet openings. To eliminate liability of leakage, due to twisting strains on uneven roads, Overland radiators are supported at the sides by two vertical swiveled bearings which permit a slight swinging motion. Water circulation is of the thermo-syphon type. The cooling fan runs on ball bearings, and is belted to the crank shaft.

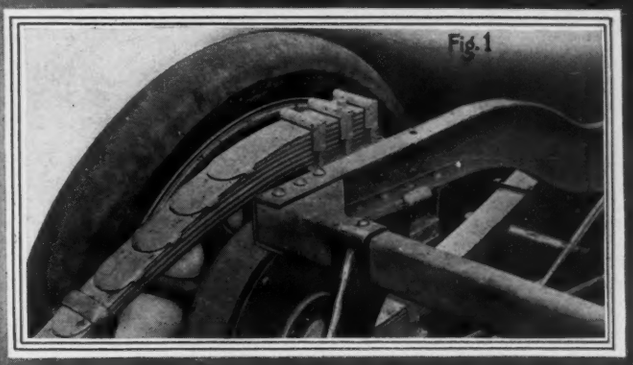
Ignition. Ignition is by the dual system. Both magneto and battery are employed through a single set of spark plugs.

Carburetor. Overland cars are equipped with Schebler model "L" carburetors. Their special advantages are quick vaporization and consequent easy starting; economy of fuel, with the greatest percentage of power for a given amount of gasoline and satisfactory operation at all speeds, obviating difficulties often encountered at slow motor speeds.

Cam Shafts. Owing to the accuracy and perfection of machining and grinding Overland cam shafts, and owing to the large bearing areas throughout, the motor will run indefinitely without a perceptible change in valve timing. However, a means of adjustment is provided, if for any reason need for same should arise.

Lubrication. Lubrication is provided on models 58 and 59 by a force feed mechanical oiler actuated by the cam shaft, and on models 60 and 61 by a mechanical oiler self-contained within the crank case.

Direct Drive. The Overland is the only car of its class provided with a five-bearing crank shaft. This feature provides a support on each side of each connecting rod as it gives its power stroke, which ensures the greatest possible rigidity and keeps the crank shaft in perfect line on its bearing. This crank shaft is drop forged from one piece of carbon manganese steel and rotates in five bearings of unusually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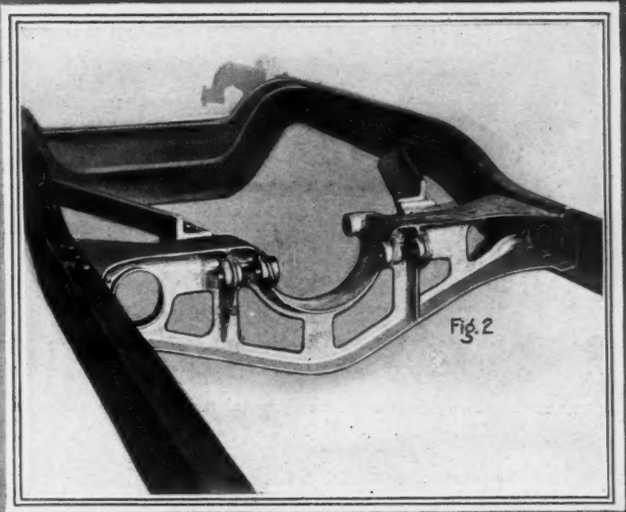
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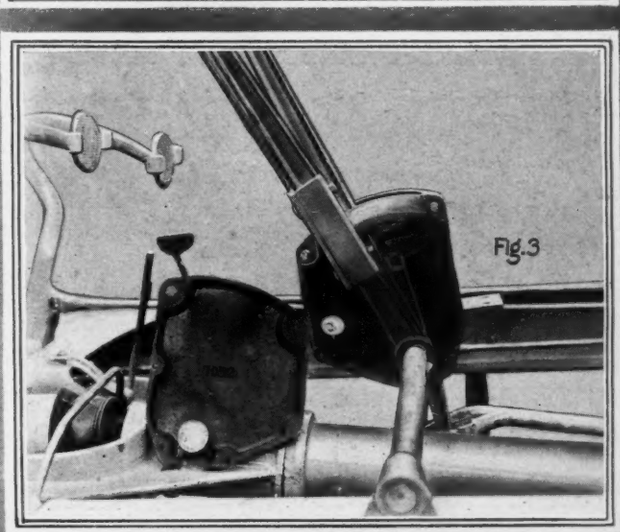
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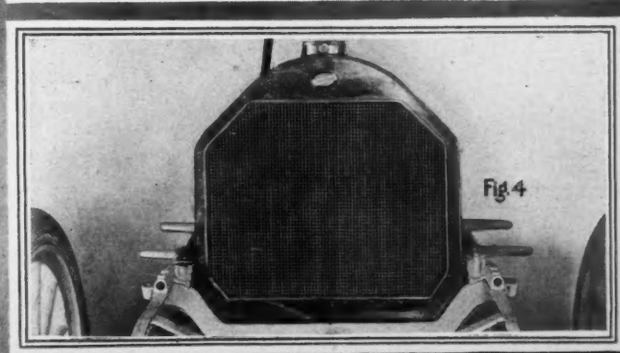
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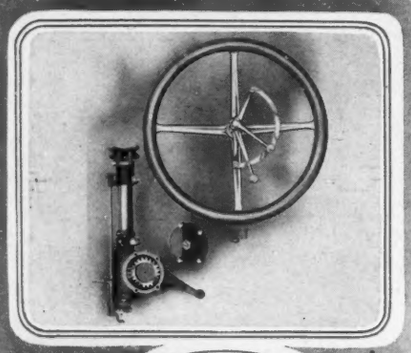
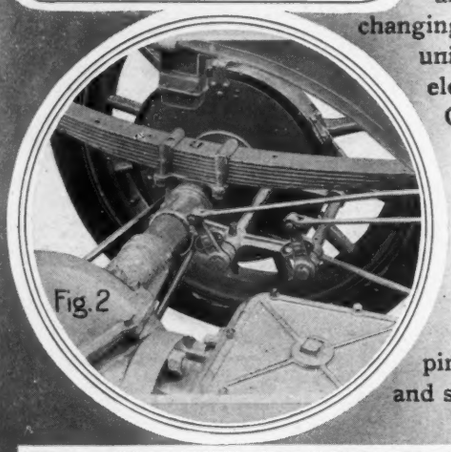


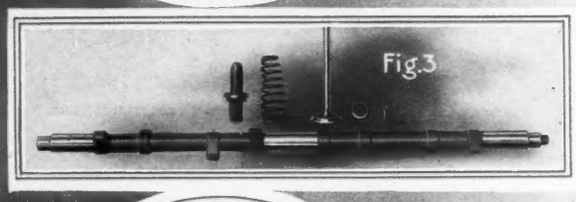
liberal peripheral area, ensuring quietness and extremely long life.

Clutch. A smoother, more delicate, and at the same time more positive clutch than the Overland cone clutch does not exist. It is of such design and construction that in starting the car there is never a shock or jar. The facing is not lubricated. It is, therefore, unaffected by weather conditions. This clutch can be removed without disturbing the motor or propeller shaft and can be adjusted quickly by raising the foot boards and turning three nuts.

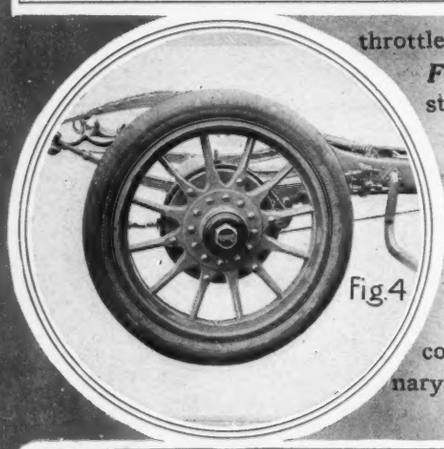
Transmission. The transmission set is either planetary or selective, depending upon the model of the car. Overland transmissions are compact and simple, but very rugged in construction. The speed changing, final drive, and differential gears are contained in the rear axle unit. Only one universal joint is required, as there are no transmission elements in the main frame. The transmission gears are made of Chrome-Vanadium steel.



Final Drive. Final drive is effected from the propeller shaft to the rear axle by means of accurately cut and carefully hardened bevel gears, the usual differential and two live axle shafts which drive the rear wheels. The wheels revolve upon large roller bearings, carried within the axle tube, this axle tube being thoroughly trussed to prevent possible disalignment. Special roller bearings are provided for all rotating components, and the bevel gears and pinion are of drop-forged nickel steel, cut in accurate Overland style, and scientifically heat treated.

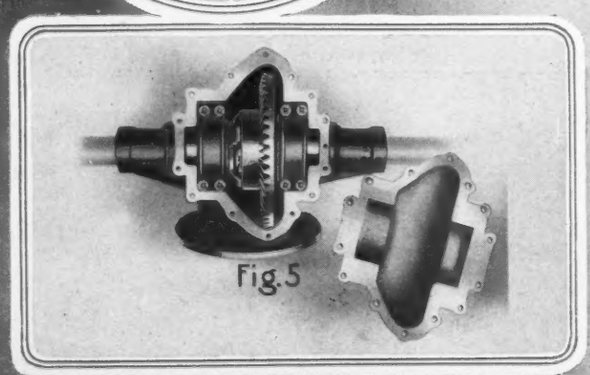


Control. One model is provided with the famous Overland two-pedal control. One pedal, when pushed forward, engages low speed, and when pushed back, engages reverse. The other pedal automatically disengages low speed, and engages high. The remainder of the models are controlled by hand gear shift levers, three speeds forward and reverse. The usual spark and throttle levers are provided on the steering wheels of all models.



Frames. Overland frames are constructed of cold rolled pressed steel, formed in channel sections of effective design, great strength and stability. Their design also provides for considerable flexibility, thus eliminating the danger of breakage.

Steering Gear. Overland gears are of the worm and worm-gear type. The steering connecting rod between the steering knuckles and steering column gear is placed in such manner as to minimize stresses and vibrations. All joints are incased and supplied with ball thrust bearings, adjustable in all directions. The gear being a complete wheel, provides four times the wearing surface of the ordinary segment.



Wheels. Wheels are of the heavy artillery type of special construction and equal to those used on the most expensive cars. They are of second growth hickory, kiln-dried and mounted upon strong hubs, with bolt for each spoke.

Front Axles. Front axles are of the I-beam section type, drop-forged in one piece, heat treated in the most approved manner in our own factories, and capable of withstanding the severest road shock.

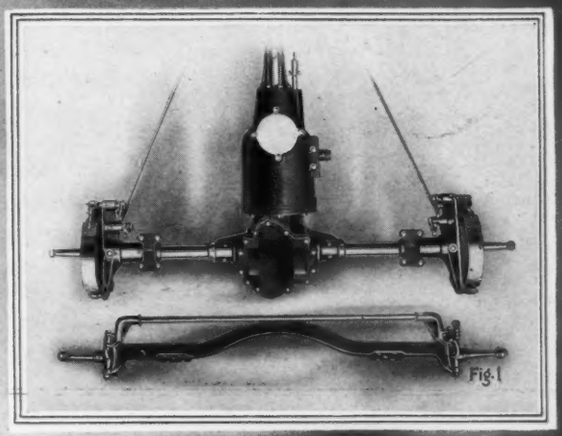
Brakes. Brakes are particularly large and have ample friction areas. There are two brakes on each rear wheel, the inside or foot-brake which is internal expanding; the outside or emergency brake which is external contracting.

Springs. Springs are of the semi-elliptic, three-quarter elliptic and full elliptic types, depending upon the model chosen. They are of ample length and width, sufficiently strong to resist many times the strain which is brought to bear on them in actual use, but of luxurious flexibility. The rear springs are mounted on spring chairs that have a lubricated bearing on the rear axle tubes. This form of construction produces an easy-riding car, as it permits the springs to act freely; it also removes all torsional stresses on the rear axle tubes.

¶ Some of the more important changes in the 1912 models are given herewith in brief detail.

¶ The center control proved so popular and was so satisfactory that it has been adopted on all models for 1912.

¶ This is also true of the fore-door style of body, all 1912 models being so equipped. This center control, brought about largely by the adoption of the fore-door body construction, has a great many advantages over the old style of right hand control. In the first place it gives the driver full use of his right hand and permits of a much better mechanical job than the old type. There is no trouble experienced in changing from driving a car with the right hand to a center control. Anybody can become thoroughly accustomed to the change in ten or fifteen minutes and the consensus of opinion of almost everybody who has used both controls is that the center control is much superior. A new vertical "H" slot gear shift has been installed on all the 61 models.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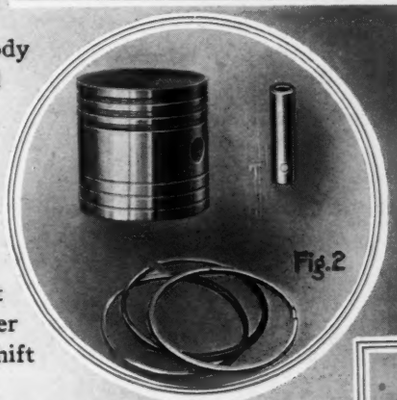
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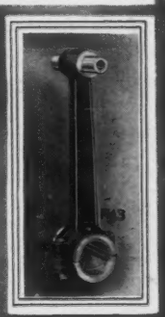


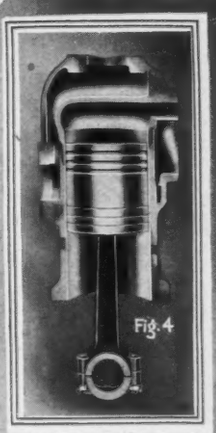


Fig. 4

¶ A new type of packing glands is to be found on the rear axles of 58, 59 and 60 models, while in model 61 a real stuffing box packing system is being used. This prevents leakage of oil from the differential which would get on the brakes and spokes.

¶ That this is a very valuable change requires no particular emphasis, for every person who has ever driven a car realizes the importance of having brakes that will take hold and not slip. If oil gets on the brakes there is always present the danger of slipping and unfortunately this slip usually comes with the emergency. This new Overland construction positively makes it impossible for oil to leak on to the brakes.

¶ All gear boxes are equipped with F & S bearings. On 60 and 61 models direct drive is by internal gear.

¶ There is a special adjustment for adjusting the driving pinion on the differential gear on all of the 61 models. On all models the valve lifter rod assemblies have been improved so as to prevent leakage of oil. The oil capacity of the motors has been increased practically 100 per cent. The arch of the springs is slightly lower, giving a lower carriage of the body. Special attention is called to the fact that the wheels are all heavier and made with a bolt through each spoke.

¶ The use of additional bolts on the wheels this year will avoid rocking and make the wheels infinitely stronger than they have been in the past. The Overland Company has been particularly fortunate in never having had any trouble with the wheels, but in keeping with the general advancement of manufacturing practice and as a precautionary measure changes in the size and construction of the wheel has been made.

¶ The capacity of the thermo-syphon water pipes has been increased on the various models from 25 to 75 per cent.

¶ As has been stated before, the radiators this year are all real tubular radiators with flat tubes. Also there are no false fronts on the 1912 Overland radiators. The cooling system, with the changes in the thermo-syphon pipe capacity and with the slight changes in the radiators themselves is as efficient as it is possible to produce.

¶ Another important refinement on the new models is the method of packing the valve stems. The base of the guide for the valve stems is cupped, forming an annular space in which a felt washer seats. This felt washer is held in place by means of a steel cup which is held upwards against the bottom of the guide by a coiled spring which surrounds the valve stem and the entire assembly is incased in an aluminum cup. This gives a perfect packing box construction and is the first of its kind used in any valve assembly. This packing prevents dirt from entering and scoring the valve stems and also prevents the escape of lubricants.

REALIZING the necessity of having the men happy and contented in order to work at the maximum efficiency, Mr. Willys has taken a keen interest in the men's play hours.

Everything possible to be done to make their lives as pleasant out of the shop as in it is being done. Holidays are frequent and on many of them there are gatherings of the entire factory force for one method of amusement or another. They go to ball games as a unit, thousands strong, have picnics and field day meetings that draw enormous crowds of Toledo citizens, and take every opportunity to have real wholesome pleasure. And back of all these gatherings and doings the owner of the Overland plant stands with his time and his money to make them successful in every detail.

Within the fold of the organization there is a band of fifty pieces under the direction of a professional musician. This band is one of the famous musical organizations of Northwestern Ohio and their services are in great demand. In fact, they are so popular that certain limitations had to be placed on the members' leave of absence from work.

Then there is an athletic organization, which indulges in all athletic tests and games. This also is in charge of an expert athletic director. From this organization basket ball teams, baseball teams, football teams and track teams have been organized that have made records hard to beat anywhere in the country. The basketball team that just finished the past season was easily one of the fastest semi-professional teams that ever played together. They beat everything in sight before the season was over and played some big teams. The baseball team won the city championship last year and has walked over some of the best semi-pro teams in the country. The team this year is doing the same stunt over again. The outlook for the football team this winter is very bright, and some college and prep school teams have been scheduled already for games. On this team there will be no less than six or seven college men who represented big college teams during the last few years.

When the field day meeting was held just a few weeks ago some of the events brought out marks wonderfully close to records. In fact, every team in the organization is so expert that it is difficult to match them from nearby material, and now matches are being booked from such distant points as New York and Chicago.

These facts simply bear out a statement dwelt upon in another part of this story that the personnel of the Overland factory is remarkable in that it shows a superior class of men to those ordinarily found in factories and shops.

A palatial club house for the use of Overland employees has just been opened on Maumee Bay.

This club house is located in one of the most picturesque spots on the Great Lakes, where it is always cool and inviting. Attached to the club house is a fully equipped boat house, with two boats and all the paraphernalia that goes with it. Notwithstanding the fact that it is miles away from the business center, the Overland Company has been able to have electric lights and power carried down to the club house and telephones installed.

The entire factory force plays just as hard as it works, and, individually, the men are all as proud of the social organization in the factory as they are of the work which they produce.

One of the Toledo newspapers recently conducted a subscription contest, the first prize of which was the sending of an organization to the World's Championship Baseball Series, to be played this fall. The athletic director of the athletic association immediately spread the news around the factory that the Overland Baseball Team was very anxious to win the prize. Needless to say they won the prize—there simply was nothing else to it.

INDICATIVE of the wonderful continued growth of the Overland Company is the fact that at the present writing there are no less than seven new buildings in various stages of completion. Two or three are partially occupied now and the rest of them will all be in shape to participate in the turning out of the 1912 models. The Engineering building is beyond question the most modern and complete of anything of its kind in the country; this is a fire proof structure of reinforced Fenestra steel and concrete, brick faced. It is 40 x 105 feet and contains three stories and a basement. This building is devoted in its entirety to the engineering department and everything to facilitate the operation of a factory along the lines of the most modern automobile practice is found within the four walls of this new structure.

¶ The basement is used entirely as a store-room; the first floor is taken up by the model and experimental rooms and the physical testing laboratory, a full description of the contents of which was given on page five. The model and experimental rooms, as the names imply, are devoted to the work of turning out new models and to designing improvements, etc., in keeping with the advancement of the industry.

¶ The second floor is divided among the engineering offices, sample room, library, design room and the chemical laboratory described fully on page four. The Overland library is complete in detail, and practically everything published bearing on automobile construction, as well as an exhaustive array of works on all of the allied sciences and industries, are to be found in this room.

¶ The sample room is another one of those unique departments so frequently found throughout the Overland plants; it is the only room of its kind in the entire industry. All parts or accessories bought by the Overland Company from samples instead of blue prints are kept in this room. It is obvious that, if certain parts or stock are ordered by blue prints it is an easy matter for the laboratory and the inspection department to measure and check these parts and see whether they conform to the blue prints, but it is another proposition to be able to tell always whether some lamp, magneto, or battery is of the same standard as the sample submitted and from which the stock was ordered unless the original sample be at hand from which to make the comparison.

¶ A magneto representative might come into the plant with a sample of his product, leave it with the engineering department for a test and be given a large order on the showing of the sample. This order, however, may not be up to the standard of the sample. If the company does not have the original sample to make comparative tests they are helpless in their action against the manufacturers to compel them to make good. To handle this situation this sample room has been constructed. Every sample is kept by the company, tagged with a full record of its performance, and then when the shipments are made they must conform to the records on the sample itself.

¶ In the design room the cars are laid out full size. By this is meant that on a huge drawing board the entire car is laid out just as it will appear when ultimately on the road. After the complete unit has been drawn, the various component parts are drawn in what is known as the detailed drafting room on the third floor. Here the Overland Company takes advantage of the most advanced methods of designing.

¶ In most other plants a general idea is arrived at as to what cars are to be turned out, but before the complete draft is made the detail drawings are made by separate individuals. One man will lay out the engine, mark upon it the sizes, etc.; another man will lay out the frame, still another the rear system, and so forth all down the line. Then after all these detail drawings are completed an effort is made to construct them into the one complete unit.

¶ Of course there are always a lot of variations and conflicts, such as trying to put a 56-inch unit into a 55-inch space, and the result is a lot of lost time and warfare between the different men who have participated in the making of the drawings. But in the Overland plant the full drawing is made first, with every assembly and every part indicated on that drawing, then it is up to the men in the detail department to make their details conform to the master drawing. On the third floor, in addition to the detailed drafting room, there is an immense room devoted entirely to making blue prints, which are turned out, washed and dried at the rate of six feet a minute.

¶ The largest building now under way, which is 300 x 400 feet, with three stories and a basement, is also of concrete. It will house the body shop, wood working machine shop, paint shop, trim shop and the shipping department. The dry kiln mentioned previously is built alongside of this building. Next to this kiln is a lumber storage yard and shed 80 x 20 feet, which is the completing link in a chain from the lumber yard into the dry kiln and from there into the wood working machine shop.

¶ The new die shop is 124 x 60 feet long, principally of glass and steel. The annealing shop, which has been constructed at the left of the forge shop, is 100 x 60 feet and contains a battery of furnaces equipped with the latest type of oil tanks and other machinery for heat treating in the most improved manner.

NQUESTIONABLY the most progressive step in the history of the industry is the introduction of the new Overland five passenger, fore-door touring car at $900.00. It is probably the greatest single manufacturing stride ever made in this or any other industry. It is an industrial leap directly due to the remarkable and economical progress of a giant institution.

¶ To start with, this car is a real automobile—not a little, frail, cramped machine but a good, big, roomy car that has ample room for five passengers. The motor is the famous Overland type—3¾ x 4½—and will develop greater speed than any other of a similar rating. As a matter of fact it has more power and speed than you will probably ever want to use.

¶ It is made with the fashionable fore-doors with door handles inside and center control. And what is more it is built right—having the strength of cars that cost twice the price. For instance, the gussett plates used on the rear springs have a factor of safety for 500% more strain than they will ever be required to undergo.

¶ The car is beautifully finished. The upholstery work is of the very best leather and selected hair goods. All trimmings are of the finest materials that can be had. This new model from every possible comparative standpoint is the greatest value for the money that has ever been placed on the market.

¶ The ability to produce this car at the price explains more forcibly than any printed word the logic and potency of all of the points brought out in this story regarding the merits of the entire Overland organization. The fact that no other manufacturers are able to produce the equal of this car in value is proof positive of all the Overland claims of superiority in every department of the industry.

¶ As we have repeated all through this story, all manufacturing progress is due to better and larger manufacturing facilities and the most efficient methods of handling men and making and marketing goods. As a business increases its production cost decreases. The larger an output the more economical methods of manufacturing can be employed in the business.

¶ Pins, locomotives, toothpicks or automobiles, all can be made at less cost when manufactured in great quantities than if made piecemeal. Materials, steel, leather, hair, rubber, etc., all can be bought at rock if purchased in the greatest quantities. These are established commercial facts. No man can dispute them. That these indisputable facts obtain in the Overland organization is the underlying reason for the wonderful value given by the Willys-Overland Company.

¶ In the entire Overland line the proportionate value is the same, although it possibly is not so apparent at first glance in all the models as in this newest product.

¶ Every refinement possible to be made is found in the 1912 Overland line. While the changes are in no way revolutionary and in many cases unnoticeable unless special attention be called to them, they are all of great importance and figure materially in enabling the Overland Company to give the value they do.

¶ The general satisfaction that the Overland product has given in the past has assured the Overland Company of the fact that their design and construction in its broad sense is absolutely right; so, of course, the Overland individuality along these lines is in evidence in 1912 as in the past.

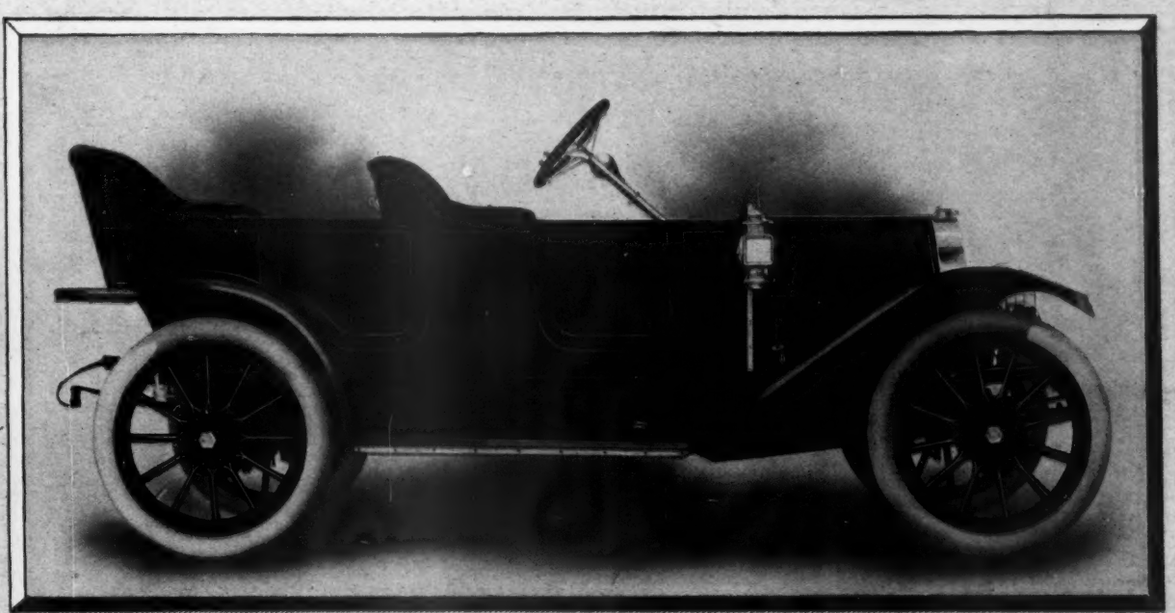
¶ A rather general discussion of some of the most important changes of details and refinements has already been had on a previous page.

¶ A careful examination of any and all of the models shown on the succeeding pages will bear out our statements. It matters not what price you wish to pay for your car, there is no place where you can make an investment and obtain for that investment so great a value as in the output of the Overland Company.

Overland

The most modestly priced touring car on the market. Reserve power and speed to meet all rational requirements. A big roomy body, carrying five passengers with all comfort. The specifications tell the story in detail.

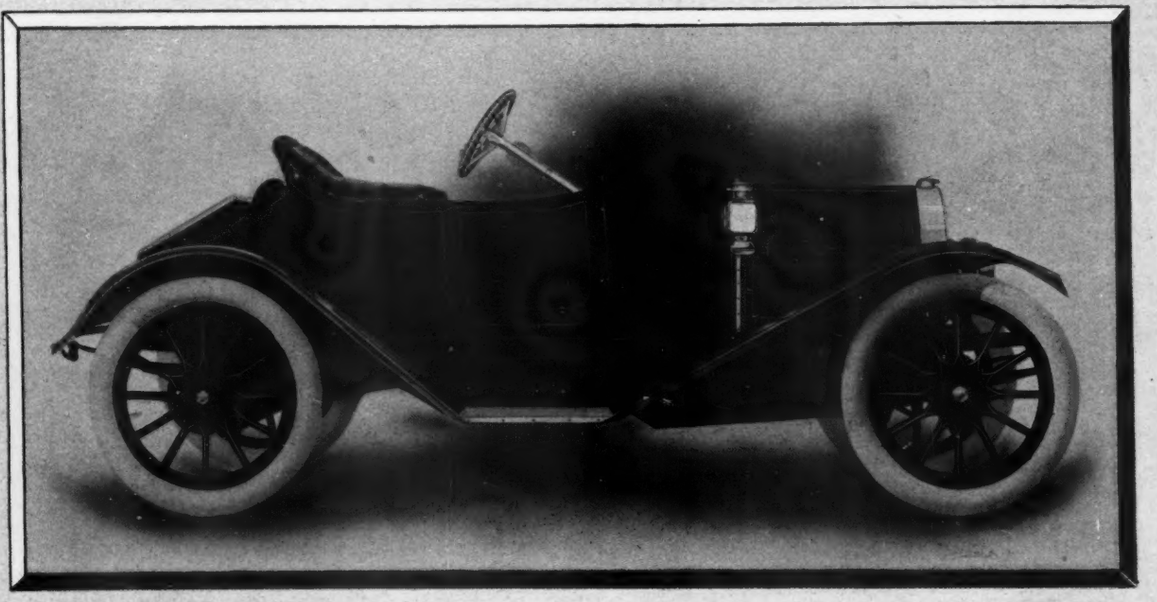
Overland



Specifications Model 59-T

Wheel Base	106 inches
Tread	56 inches
Body	5-passenger fore-door touring
Motor	4 x 4 1/2
Horse-power	30
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Splitdorf magneto and batteries
Brakes	On rear wheels, 2 inches wide, 10 inch drum, int. expanding, ext. contracting
Springs	1 3/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 16 inch wheel
Front Axle	Drop forged I-section
Rear Axle	Semi-floating
Wheels	Artillery wood, 12-1 1/2 inch spokes, 12 bolts each wheel
Tires	32 x 3 1/2 inch Q. D.
Frame	Pressed steel
Finish	Overland blue, gold stripe
Price	$900.00
Equipment	Three oil lamps, two gas lamps, horn and generator
Tools	Complete set

This model combines strength, speed and grace—all typical Overland qualities. We offer here to the man with the modest pocketbook a car of service and beauty. To understand its many practical, satisfying features, read the specifications—to know its beauty, study this illustration.



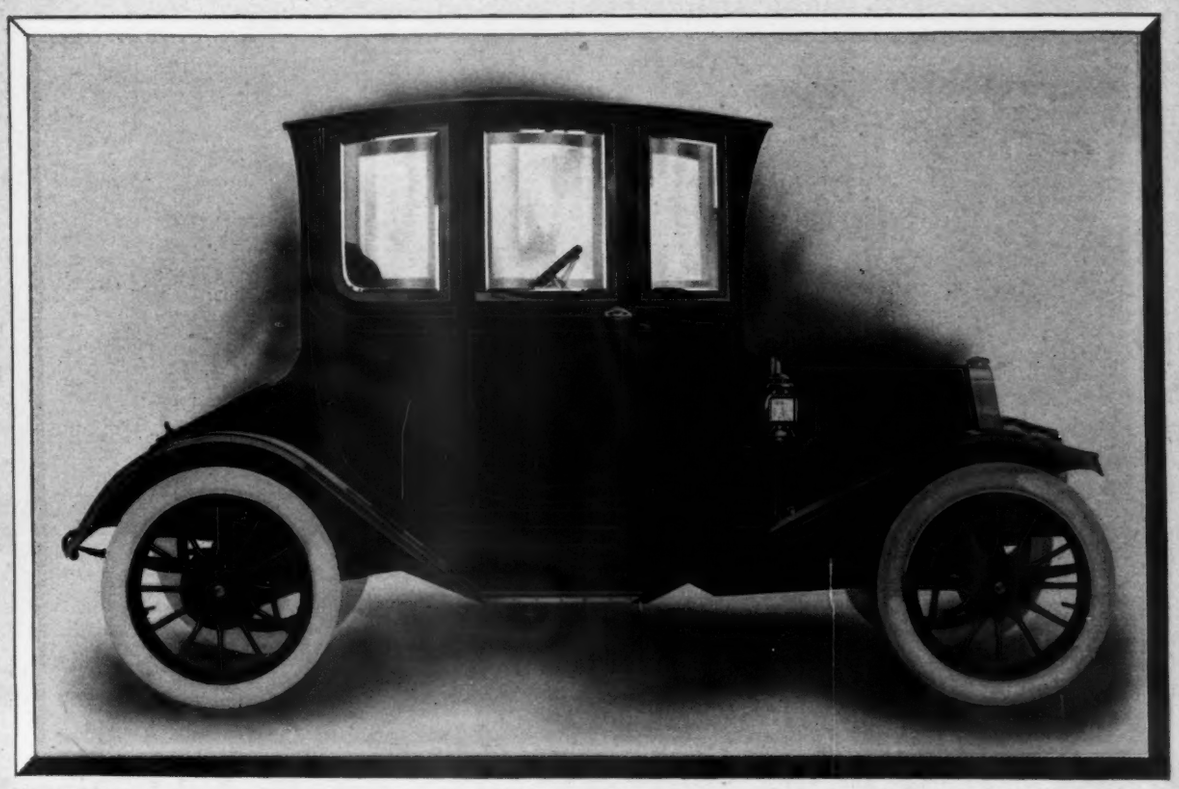
Specifications Model 59-R

Wheel Base	106 inches
Tread	56 inches
Body	2-passenger torpedo roadster
Motor	4 x 4 1/2
Horse-power	30
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Splitdorf magneto and batteries
Brakes	On rear wheels, 2 inches wide, 10 inch drum, int. expanding, ext. contracting
Springs	1 3/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 16 inch wheel
Front Axle	Drop forged I-section
Rear Axle	Semi-floating
Wheels	Artillery wood, 12-1 1/2 inch spokes, 12 bolts each wheel
Tires	32 x 3 1/2 inch Q. D.
Frame	Pressed steel
Finish	Overland blue, gold stripe
Price	$900.00
Equipment	Three oil lamps, two gas lamps, horn and generator
Tools	Complete set

Overland

An ideal car for professional men, particularly doctors, with whom dignity of appearance and weather protection are essentials. Designed along latest lines—a beauty in appearance and a model of endurance. Read the construction details given below.

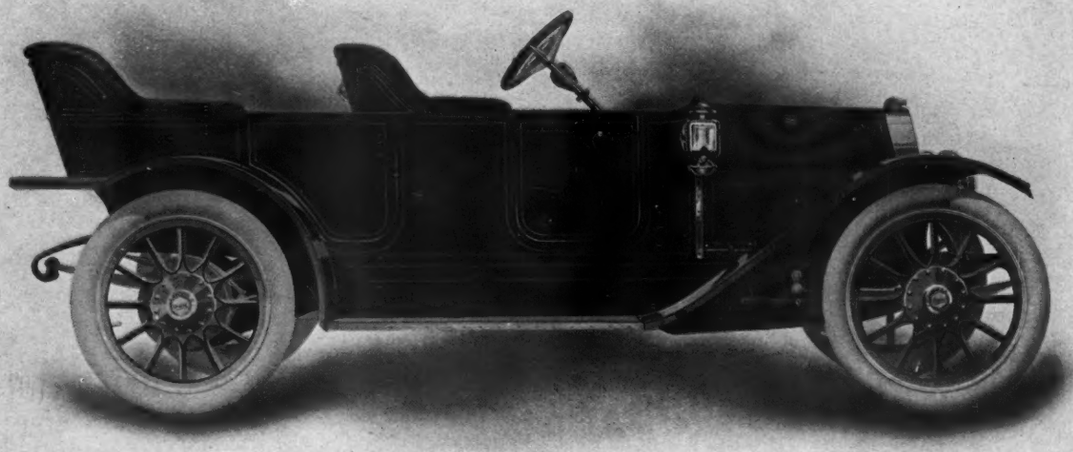
Overland



Specifications Model 59-C

Wheel Base	106 inches
Tread	56 inches
Body	3-passenger coupe
Motor	4 x 4 1/2
Horse-power	30
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Splitdorf magneto and batteries
Brakes	On rear wheels, 2 inches wide, 10 inch drums, int. expanding, ext. contracting
Springs	1 3/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 16 inch wheel
Front Axle	Drop forged I-section
Rear Axle	Semi-floating
Wheels	Artillery wood. 12-1 1/2 inch spokes, 12 bolts each wheel
Tires	32x3 1/2 inch Q. D.
Frame	Pressed steel
Finish	Overland blue, gold stripe
Price	$1250.00
Equipment	Three oil lamps, two gas lamps, horn and generator
Tools	Complete set

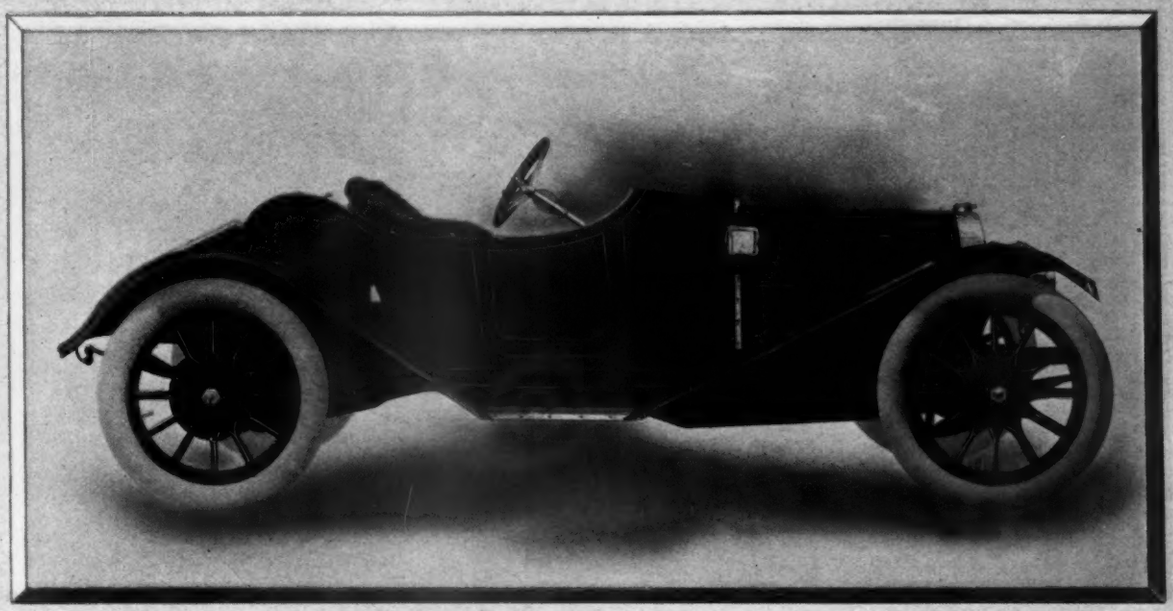
Conserving the graceful lines of the racer with the sturdy qualities of the touring car, of which much service is expected. Overland touring cars are built to "tour," offering strength, reserve power, speed and easy riding. Price low—Value far above the ordinary.



Specifications Model 60-T

Wheel Base	114 inches
Tread	56 inches
Body	5-passenger fore-door touring
Motor	4 1/8 x 4 1/2
Horse-power	35
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Remy magneto and batteries
Brakes	On rear wheels, 2 inches wide, 12 inch drums, int. expanding, ext. contracting
Springs	2 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 18 inch wheel, 1 3/4 inch post
Front Axle	Drop forged I-section, Timken bearings
Rear Axle	Semi-floating
Wheels	Artillery wood, 12-1 3/4 inch spokes, 12 bolts each wheel
Tires	32 x 4 inch Q. D.
Frame	Pressed steel, single drop
Finish	Overland blue, gray gear and wheels
Price	$1200.00
Equipment	Three oil lamps in black and brass finish, two gas lamps, horn and generator
Tools	Complete set

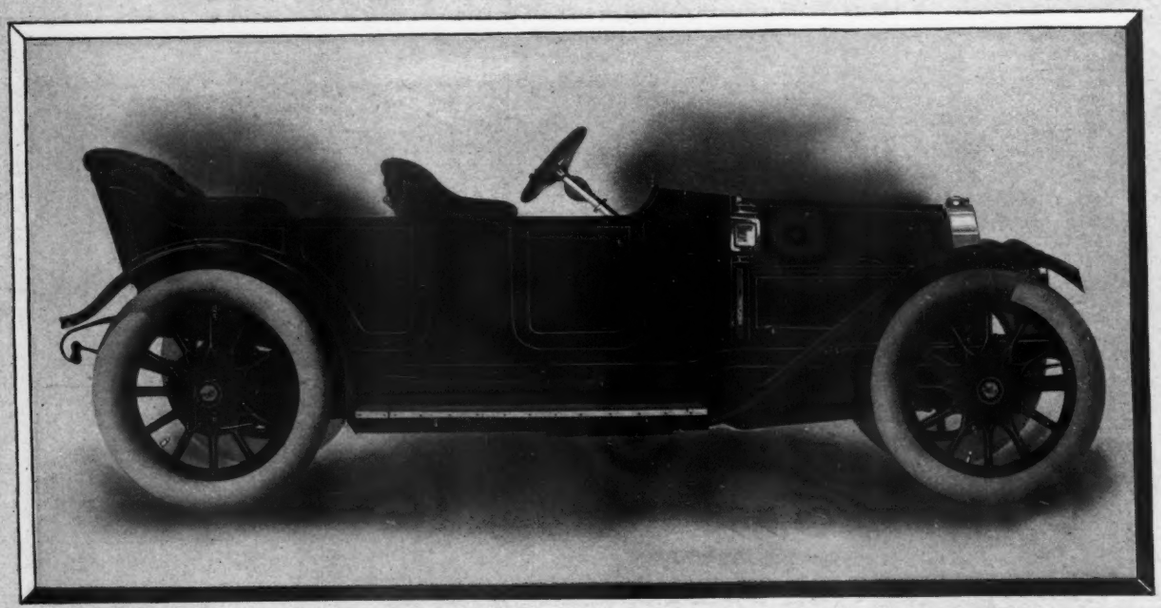
This torpedo type is a jolly little car for "just two." It is as graceful as our designers could conceive it, as strong and dependable as Overland engineering skill could make it-equally good for long or short trips. Costs $1500 and you cannot buy its equal elsewhere for $2000.



Specifications Model 61-R

Wheel Base	118 inches
Tread	56 inches
Body	2-passenger torpedo roadster
Motor	4 3/8 x 4 1/2
Horse-power	45
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Bosch magneto and batteries
Brakes	On rear wheels, 2 1/2 inches wide, 14 inch drums, int. expanding, ext. contracting
Springs	2 1/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 18 inch wheel, 1 3/4 inch post
Front Axle	Drop forged I-section, Timken bearings
Rear Axle	Full floating, Timken bearings
Wheels	Artillery wood, 12-1 3/4 inch spokes, 12 bolts front wheel, 18 bolts rear wheel
Tires	34 x 4 inch Q. D.
Frame	Pressed steel, double drop
Finish	Brewster green, ivory stripe, all bright parts nickel plated
Price	$1500.00
Equipment	Three black and nickel oil lamps, two black and nickel gas lamps, with gas tank and horn
Tools	Complete set

Admitted by experts to be the most perfect torpedo body in existence—and guaranteed to embody Overland quality and workmanship. A power plant most elastic in speed and power requirements. The specifications are before you—consider them.



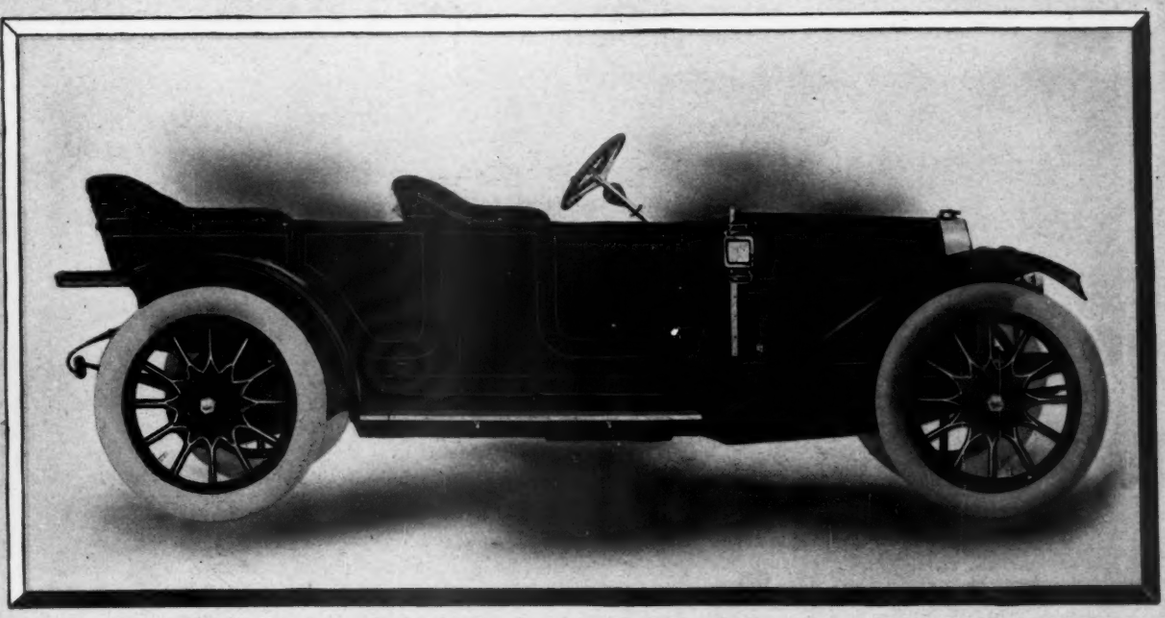
Specifications Model 61-F

Wheel Base	118 inches
Tread	56 inches
Body	4-passenger torpedo
Motor	4 3/8 x 4 1/2
Horse-power	45
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Bosch magneto and batteries
Brakes	On rear wheels, 2 1/2 inches wide, 14 inch drums, int. expanding, ext. contracting
Springs	2 1/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 18 inch wheel, 1 3/4 inch post
Front Axle	Drop forged I-section, Timken bearings
Rear Axle	Full floating, Timken bearings
Wheels	Artillery wood, 12-1 3/4 inch spokes, 12 bolts front wheel, 18 bolts rear wheel
Tires	34 x 4 inch Q. D.
Frame	Pressed steel, double drop
Finish	Brewster green, ivory stripe, all bright parts nickel plated
Price	$1500.00
Equipment	Three black and nickel oil lamps, two black and nickel gas lamps, with gas tank and horn
Tools	Complete set

Overland

You can pay more for a touring car, but you cannot get a better one at the price. We offer here every refinement of equipment and finish found on the highest priced car. If you intend to pay more, see this car first---it may change your mind and save you money.

Overland



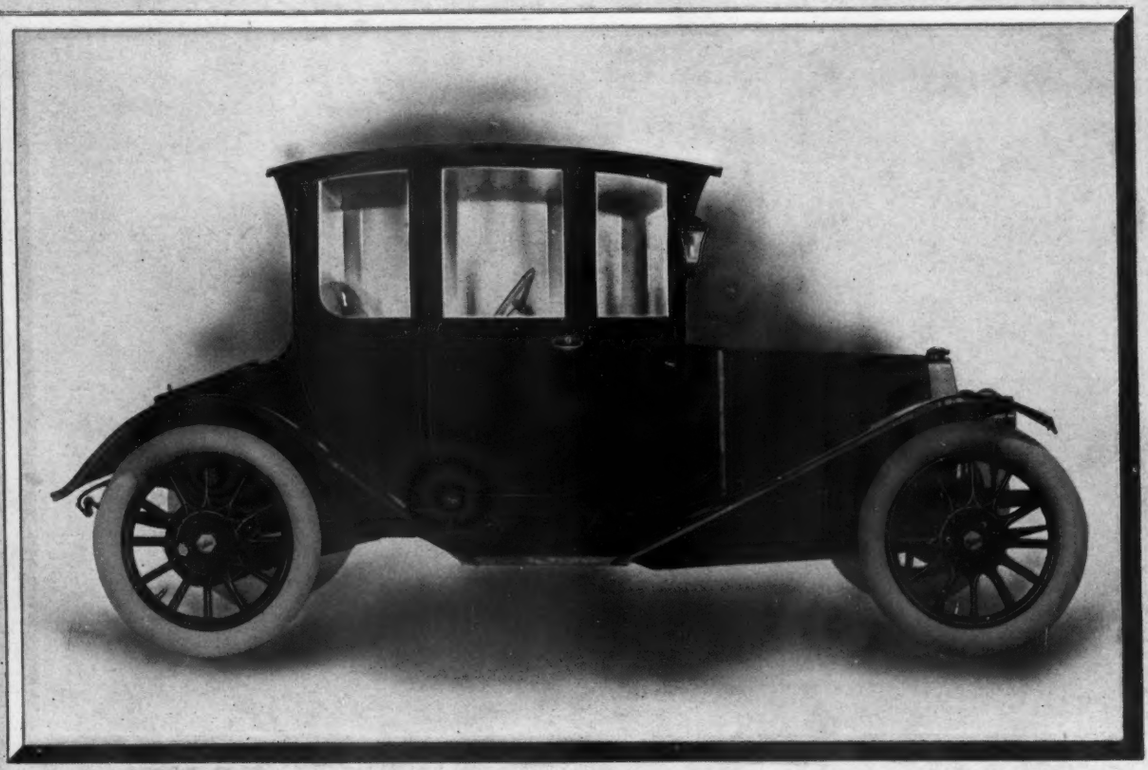
Specifications Model 61-T

Wheel Base	118 inches
Tread	56 inches
Body	5-passenger fore-door touring
Motor	4 3/8 x 4 1/2
Horse-power	45
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Bosch magneto and batteries
Brakes	On rear wheels, 2 1/2 inches wide, 14 inch drums, int. expanding, ext. contracting
Springs	2 1/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 18 inch wheel, 1 3/4 inch post
Front Axle	Drop forged I-section, Timken bearings
Rear Axle	Full floating, Timken bearings
Wheels	Artillery wood, 12-1 3/4 inch spokes, 12 bolts front wheel, 18 bolts rear wheel
Tires	34 x 4 inch Q. D.
Frame	Pressed steel, double drop
Finish	Brewster green, ivory stripe, all bright parts nickel plated
Price	$1500.00
Equipment	Three black and nickel oil lamps, two black and nickel gas lamps, with gas tank and horn
Tools	Complete set

Overland

This coupe is the last word in luxury—the embodiment of style—a car that people will turn to admire. Nowhere in the world of automobiles can be found a car exhibiting more painstaking care in construction or attention in lines of beauty. See the details given below.

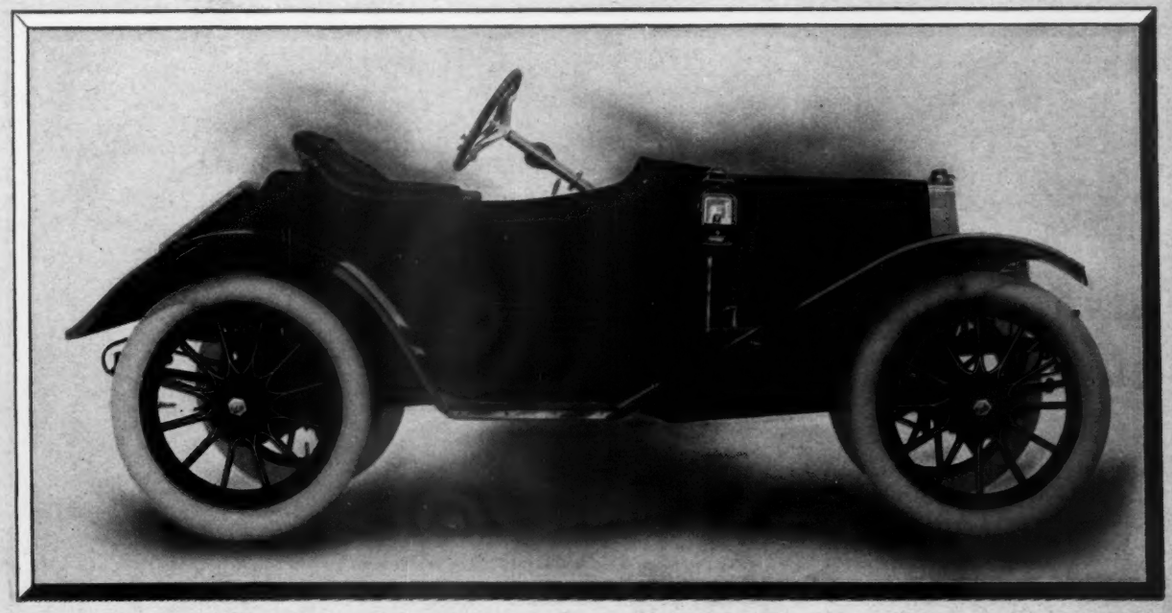
Overland



Specifications Model 61-C

Wheel Base	118 inches
Tread	56 inches
Body	4-passenger coupe
Motor	4 3/8 x 4 1/2
Horse-power	45
Transmission	Selective, three speeds and reverse. "F & S" ball bearings
Clutch	Cone
Ignition	Dual, Bosch magneto and batteries
Brakes	On rear wheels, 2 1/2 inches wide, 14 inch drums, int. expanding, ext. contracting
Springs	2 1/4 inches wide, semi-elliptic front, three-quarter elliptic rear
Steering Gear	Worm and segment adjustable, 18 inch wheel, 1 3/4 inch post
Front Axle	Drop forged I-section, Timken bearings
Rear Axle	Full floating, Timken bearings
Wheels	Artillery wood, 12-1 3/4 inch spokes, 12 bolts front wheel, 18 bolts rear wheel
Tires	34 x 4 inch Q. D.
Frame	Pressed steel, double drop
Finish	Brewster green, ivory stripe, all bright parts nickel plated
Price	$2000.00
Equipment	Three black and nickel oil lamps, two black and nickel gas lamps, with gas tank and horn
Tools	Complete set

A model embodying every feature conducive to ease of operation. An ideal car for those who appreciate the fact that starting, stopping, and speed changing are robbed of complication. Especially adapted for women and children—strong, sturdy, reliable and costs little to operate.



Specifications Model 58-R

Wheel Base	96 inches
Tread	56 inches
Seating Capacity	Two passengers
Body	Torpedo Roadster
Motor	3 3/4 x 4 1/2
Horse-power	25
Transmission	Planetary
Clutch	Multiple Disc
Ignition	Dual, Splitdorf magneto and batteries
Brakes	On rear wheels, 2 inches wide, 10 inch drums, int. expanding, ext. contracting
Springs	1 3/4 inches wide, semi-elliptic front, full elliptic rear
Steering Gear	Worm and segment adjustable, 16 inch wheel
Front Axle	Drop forged I-section
Rear Axle	Semi-floating
Wheels	Artillery wood, 12 1 1/2 inch spokes, 12 bolts each wheel
Tires	32 x 3 1/2 inch Q. D.
Frame	Pressed steel
Finish	Overland blue, gold stripe
Price	$850.00
Equipment	Three oil lamps, two gas lamps, horn and generator
Tools	Complete set

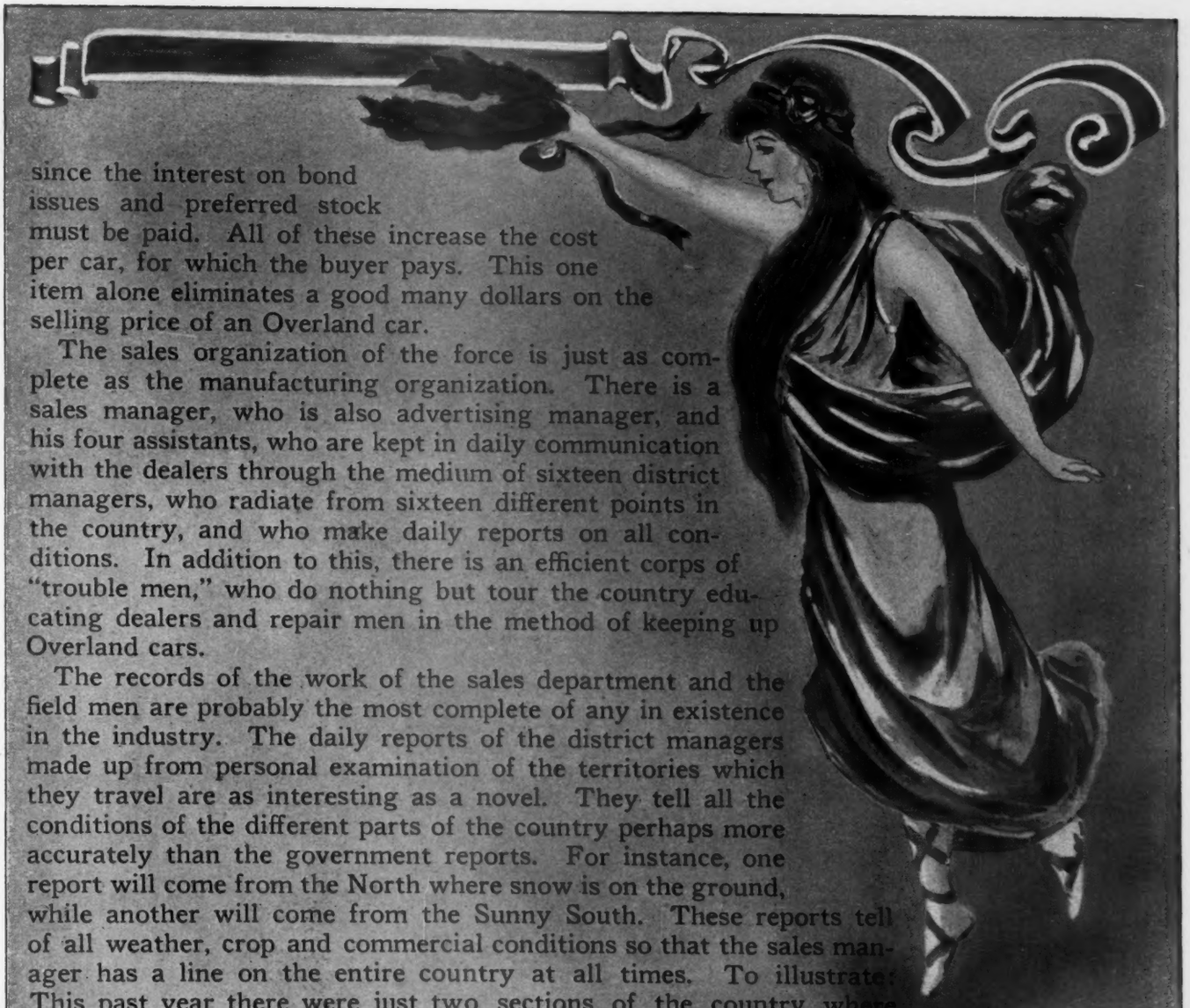
HAVING read this story, one fact must impress itself upon the minds of the readers—that is, that while the Overland production is a quantity production, quality at all times is the supreme demand. There are dozens of cases where a slighting in the detail or the elimination of the inspection, etc., would mean a saving primarily of thousands of dollars to the Overland Company, but in no single case is there such slighting.

The workmanship throughout their factory is of the same high grade as that employed on the highest priced cars in the industry. The theory upon which Mr. Willys works is that there is only one way to hold business, and that is to build cars that stand up. In other words, the profit comes not from the first sale, but from the repeat orders.

The truth of this statement can be seen in a glance over the history of the industry during the past ten years. This history will show the sudden and meteoric rise of the different cars for a season or two, and then their final dropping to the bottom of the ladder. Overland cars rose, and remained at the height they attained. As a matter of fact, the Overland plants today are the greatest of their kind in the world. They employ more men, use more labor-saving automatic machinery and buy raw materials in greater quantities than any other manufacturer. More than $63,000 worth of raw materials are utilized in the Overland plants every day.

The output of the Overland Plant is 20,000 cars per year. The average output of the direct competitors of the Overland is about 5,000 cars a year. It costs about as much for the 5,000-car factory to sell its output as it does for the factory making 20,000 cars. Consequently, the cost of selling of each car of the 20,000 lot factory is one-fourth as great as that of the 5,000-car factory, and the man who buys an Overland pockets the difference. There is no exaggeration in the statement that no other manufacturer to-day can produce the Overland car and sell it at the price without going into the hole. Another item of expense which is entirely eliminated in the Overland organization is that of the branch house. In other words, the Overland's expenses stop when the car leaves the shipping department. All Overland dealers have their own money invested and must make good or lose their own money. The greatest care is used in the selection of Overland dealers, and only those eminently able to carry out the plans of the company in showing results are retained. To illustrate the value of this point it is only necessary to cite the fact that the branch house question has nearly bankrupted several concerns.

The Overland offices are somewhat insignificant in comparison with some of the gorgeous offices of the other companies, from a standpoint of beauty. From a standpoint of efficiency, they are absolutely at the head of the list. Then the office force itself is particularly small in every way, but every man in it is a worker. Another big feature of the saving which admits of the turning out of high grade cars at a reasonable price is the fact that the Overland Company is owned by one man, John N. Willys himself. It has no bonded indebtedness, the stock is all held by him; he dictates its policies, oversees its methods, and is nearer the dealer and the ground than any other automobile manufacturer. Factories that carry bonded indebtedness necessarily carry a great overhead expense,



since the interest on bond issues and preferred stock must be paid. All of these increase the cost per car, for which the buyer pays. This one item alone eliminates a good many dollars on the selling price of an Overland car.

The sales organization of the force is just as complete as the manufacturing organization. There is a sales manager, who is also advertising manager, and his four assistants, who are kept in daily communication with the dealers through the medium of sixteen district managers, who radiate from sixteen different points in the country, and who make daily reports on all conditions. In addition to this, there is an efficient corps of "trouble men," who do nothing but tour the country educating dealers and repair men in the method of keeping up Overland cars.

The records of the work of the sales department and the field men are probably the most complete of any in existence in the industry. The daily reports of the district managers made up from personal examination of the territories which they travel are as interesting as a novel. They tell all the conditions of the different parts of the country perhaps more accurately than the government reports. For instance, one report will come from the North where snow is on the ground, while another will come from the Sunny South. These reports tell of all weather, crop and commercial conditions so that the sales manager has a line on the entire country at all times. To illustrate: This past year there were just two sections of the country where early reports showed very poor conditions. Crops had been ruined in both places and the outlook was for the sale of mighty few cars in those territories. With these facts in front of him the sales manager refused to allow the agents to have as many cars as they wanted to take. There was a long argument and the agents held firmly for their request. They were certain that they could sell many more cars than they were asking for.

When the season closed it was found that the figures of the sales manager were almost accurate as to the number of cars sold in these territories. Had it not been for this fine information and careful calculation in the home office two dealers would have been overstocked with cars. They would have lost all their profits and the factory would have suffered in the territory in consequence. Instead of this unhappy condition these two men are more staunch and enthusiastic in their support of the Overland company and are working hard to make up for the loss of the past season.

The entire organization, both the management and sales end, is operated scientifically, so that it is impossible for the Overland Company to over-produce one car. At the end of every season every car is sold and delivered.

Machinery with automatic-intelligence—methods in which nothing is left to chance or accident—men with brains synchronized in the one fixed law of standardization, all held in harmony within factory walls through faultless organization and system. This is the constructive force back of the Overland productions which come to the critical buyer with the regularity and precision of perfect coins from the mint.

1912
GUARANTEE
STANDARD WARRANTY
Adopted May 4th, 1910
NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS
(Incorporated)
We warrant the motor vehicles manufactured by us for ninety days after the date of shipment, this warranty being limited to the furnishing at our factory of such parts of the motor vehicle as shall, under normal use and service, appear to us to have been defective in material or workmanship.
This warranty is limited to the shipment to the purchaser, without charge, except for transportation, of the part or parts intended to replace the part or parts claimed to have been defective, and which, upon their return to us at our factory for inspection, we shall have determined were defective, and provided the transportation charges for the parts so returned have been prepaid.
We make no warranty whatever in respect of tires or rims.
The condition of this warranty is such that if the motor vehicle to which it applies is altered, or repaired outside of our factory, our liability under this warranty shall cease.
The purchaser understands and agrees that no warranty of the motor vehicle is made, or authorized to be made, by the company, other than that herein above set forth.
THE WILLYS-OVERLAND COMPANY
Member of Automobile Board of Trade

COLUMBIAN THREE COLOR CO., CHICAGO